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USSR Report

MILITARY AFFAIRS

No. 1666

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USSR REPORT

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CONTENTS

LOGISTICAL SERVICES AND SPECIAL TROOPS

CIVIL DEFENSE

PERCEPTIONS, VIEWS, COMMENTS

ARMED FORCES

TABLE OF CONTENTS OF 'MILITARY HERALD,' DECEMBER 1981

Moscow VOYENNYY VESTNIK in Russian No 12, Dec 81 (signed to press 30 Nov 81) p 3

[Text] Contents

9887
CSO: 1801/126

TABLE OF CONTENTS OF 'MILITARY HERALD,' JANUARY 1982

Moscow VOYENNYY VESTNIK in Russian No 1, Jan 82 (signed to press 28 Dec 81)
p 1

[Text] Contents

9887
CSO: 1801/126

TABLE OF CONTENTS OF 'EQUIPMENT AND ARMS,' JANUARY 1982

Moscow TEKHNIKA I VOORUZHENIYE in Russian No 1, Jan 82 (signed to press 15 Dec 81) unnumbered

[Text] Contents

Armies of Capitalist States

9887
CSO: 1801/126

ARMY PAPERS' COVERAGE OF DISCIPLINE SURVEYED

[EDITORIAL REPORT] Moscow KRANSNAYA ZVEZDA in Russian 24 March 82 carries on page 2, under the headline "Important Task of Military Press" and the rubric "On Newspaper Themes," a 1,750-word article by Col N. Rumyantsev discussing the coverage of the "need to maintain the highest discipline" in district, group and fleet newspapers, in particular the papers of the Baltic Military District and the Volga Military District, which are both called ZA RODINU. Rumyantsev notes that the papers are publishing "many items on the theme of military discipline" and are displaying a "more thoughtful and analytical approach to revealing negative phenomena." Nonetheless, he complains of the "sketchiness and superficiality of judgments, the lack of persuasive arguments and slipshod elaboration of the theme" in these and other military newspapers. Rumyantsev writes: "The collectives of a number of newspapers are often superficial in analyzing educators' practice and in raising questions of installing lofty political, business and moral qualities in commanders, especially young commanders, and equip them poorly with knowledge of pedagogy and psychology and the art of teaching people. Many journalists lose sight of questions such as the study of people, the ability to influence them in the right direction, the acquisition of a commander's tact and the correct utilization of disciplinary rights. In a number of cases they fail to react to cases where certain officers and warrant officers bellow at servicemen and do not show the requisite concern for their needs and demands."

CSO: 1801/169

AIR DEFENSE FORCES

TABLE OF CONTENTS OF 'AIR DEFENSE HERALD,' DECEMBER 1981

Moscow VESTNIK PROTIVOVOZDUSHNOY OBORONY in Russian No 12, Dec 81 (signed to press 2 Dec 81) p 4

[Text] Contents

Rostrum of Advanced Experience

The Engineer and Operation of Combat Equipment

Practical Activity By Rear Services

History and Tradition of Air Defense Troops

Criticism and Bibliography

9887
CSO: 1801/130

AIR DEFENSE FORCES

TABLE OF CONTENTS OF 'AIR DEFENSE HERALD,' JANUARY 1982

Moscow VESTNIK PROTIVOVOZDUSHNOY OBORONY in Russian No 1, Jan 82 (signed to press 5 Jan 82) p 2

[Text] Contents

9887
CSO: 1801/130

AIR DEFENSE FORCES

RELOAD TRAINING DISCUSSED

Moscow KRASNAYA ZVEZDA in Russian 19 Jan 82 p 1

[Article by Maj V. Sipugin from the Central Group of Forces: "A Commander's Lessons"]

[Text] During the tactical exercises, the antiaircraft missile batteries had to replenish their battle reserves. This task was assigned to Major V. Voznyuk's subordinates. The specialists of the technical battery all got down to business together. Minutes are counted off and the silvery arrows of rockets are on the launchrails. The work was done more quickly than the norm required. All work relating to missile systems checks was performed with high quality.

When Major Vozyuk is asked how the battery manages to produce good results, he smiles: "You can't answer that right away."

That's right, success didn't come right away or of its own accord.

There was a time when the specialists always beat the norms while carrying out operations on the equipment, but the quality of work left a lot to be desired. Of course, it wasn't a question of any serious errors. There was simply a lack of the completeness which distinguishes real experts and provides a good starting point for the work of other types of specialists.

The battery commander and his deputy, Senior Lieutenant S. Semenyuta, pondered many times about how to improve the quality of completion work for combat training tasks. They analyzed the progress of exercises conducted by commanders and explained that the commanders were tolerating various methodological errors.

Thus, Lieutenant A. Berezovskiy strives from the first to the last minute of a drill to maintin a fast pace. Of course, this is praiseworthy. But the officer is not taking into account that such a pace of work is beyond the capability of certain specialists, especially young specialists. A new recruit strives to keep up with his comrades, so he hurries and makes mistakes.

It was proposed that Lieutenant Berezovskiy take a different approach: let the young soldiers work at the start of a drill without monitoring the amount of time they take to carry out their operations. In this case, during the course of operations a manager can point out weak areas in the training of young specialists and correct them. Then he can start using a stopwatch.

Lieutenant Berezovskiy quickly became convinced that such a method for conducting exercises and drills was more efficient.

An important trend in the work of a battery commander and his deputy is to constantly increase the commanders' mastery of methods. While possessing a great deal of practical experience, they pass it on to young officers and warrant officers and help them attain a high level of activism by the soldiers during training.

Once, after an exercise had been summed up, Major Voznyuk wanted to find out from Lieutenant A. Zelenskiy why some specialists in a crew had high qualifications while others received third-class ratings and were satisfied with such ratings. For example, how could one explain the fact that Private A. Belokon' was not progressing as a specialist? Zelenskiy explained that this was due to the soldier's personal qualities: "He doesn't make any special effort, plus his general education is a bit weak."

Major Voznyuk said nothing. But, the next day he was present at an exercise conducted by Lieutenant Zelenskiy. It turned out that the Lieutenant was more demanding of those who showed initiative, who were better trained. But Private Belokon' and some other soldiers behaved passively and remained, as it were, outside the field of vision of the exercise director. The battery commander pointed out this serious error to Zelenskiy. In time, the officer eliminated this problem and improved his work with subordinates. Many soldiers improved their skill ratings, including Private Belokon' who became a second-class specialist.

Meanwhile, Warrant Officer Vdovin was having difficulties of another sort, purely psychological, one might say. Vdovin had served for a fixed period in a technical battery and arrived in the same unit after becoming a warrant officer. So it happened that he had to command those who had recently been his comrades. That is not a simple matter. Consciously or not, he began by making special allowances for his former colleagues. For instance, everyone else would work by the sweat of their brow during a drill, but his subordinates took it easy.

How Could Warrant Officer Vdovin Be Helped?

Major Voznyuk came to the exercises and provided some scenarios. Completely unexpectedly for Warrant Officer Vdovin, it turned out that the men whom he had considered to be aces had not produced good results. It became clear to him where indulgence was leading to. Thus, without extraneous moralizing, Major Voznyuk helped Vdovin correct the error and be more demanding of his subordinates.

Such lessons from the commander are very useful to officers and warrant officers and enrich them with valuable experience in instructing and educating subordinates.

At the height of winter combat training, the personnel of the technical battery commanded by Major Voznyuk are persistently struggling to further improve their combat training and successfully fulfill their socialist obligations in honor of the 60th anniversary of the formation of the USSR. The missile troops are making every effort so they will receive an outstanding evaluation for the fourth time in succession.

9887
CSO: 1801/130

NUCLEAR SUBMARINE TRAINING DESCRIBED

Commander Qualities Described

Moscow KRASNAYA ZVEZDA in Russian 22 Dec 81 p 2

[Article by Hero of the Soviet Union Captain 1st Rank V. Lushin: "The Longevity of a Ship's Officer"]

[Text] Submariner Captain 1st Rank Vladimir Petrovich Lushin was born in blockaded Leningrad. It was there that, in 1966, he was graduated from the Higher Naval School imeni M. V. Frunze and was assigned to serve with the Northern Fleet. During his years as a naval cadet V. Lushin was an active physical culturist and earned a master of sports in boxing. It was this excellent physical hardening which enabled him to carry out his duties as a submariner successfully. As the commander of a nuclear submarine, V. Lushin was awarded the title of Hero of the Soviet Union in 1978 for bravery and valor displayed in the fulfillment of his military duties.

A submarine departs on a long trip and, after many days have gone by, returns to its base. Nothing, it would seem, has changed in any of the ship's compartments over this period of time: neither equipment, nor people, or even the very air within it. The air was the same as the air which its crew had breathed in when they had last left the shores of their motherland, except that it was constantly enriched with oxygen. Yet nevertheless at various stages of its trip it was a different ship. The principal difference was in the degree of its readiness for combat.

This was the result of many things: an enlivened atmosphere, the degree of training of the seamen, an increased level of mastery, the enrichment of their practical experience, the ever-increasing solidarity of the crew--all of this helped promote an increase in the vessel's combat readiness during the course of its trip. Yet there is an antipodal force--fatigue. Yes, unfortunately, a man's physical capabilities are not unlimited. It is precisely these limitations which limit the effectiveness of modern equipment and weapon usage.

Over the period of my service, I have participated in 15 voyages over long distances. At the end of every one of them, if you will, the men of the submarine had to fight off fatigue, something perfectly natural for a person who has spent a long time aboard ship. Inevitably there was the sapping of energy from people who are more capable than others of maintaining their force and energy, people capable of combating overstrain and of making active use of their internal reserves. This is particularly important for the ship's officers, for the commander of the ship first and foremost.

In his book "In the Depths of the Polar Seas," famous submariner Hero of the Soviet Union Rear Admiral I. Kolyshkin recalls combat cruises and, without fail, pays heed to the actions of commanders in unusual situations, situations which required not only bravery, steadfastness and will but endurance and skill at being able to maintain, over a long period of time, the capability to effectively direct his crew and to keep the reins of battle in hand.

This experience is priceless to us, the submariners of today. All the more since, under the conditions of service in a modern-day fleet, the significance of the physical training of people, of their endurance, of their capability to actively resist any unfavorable factors which are concomitant to voyages over long distances have increased immeasurably.

Today's distant trips require of our seamen a high level of physical training inasmuch as the work load placed on them is considerable. I had to experience all of this myself, just as every submariner has to. We had to spend a great many days at sea over the year while participating in carrying out dozens of firing training exercises, this at a time when I had not been a lieutenant for very long. Yet it is the physical training which I received over my years as a cadet and lieutenant which helps me to be in good physical condition today and to make it comparatively easy for me to endure the burdens of work lasting over long periods.

The duties of a ship's officer are complex. Medical requirements made of him and of his physical condition are of the highest. Yet I must confess not everyone is capable of keeping his strength up to the level attained in youth. I recall how all of us, cadets in the navigation faculty, dreamed of becoming commanders of ships. We met recently to mark the 15th anniversary of our graduation and, as it turned out, discovered that only a few people had reached that goal. What happened to the others? For one or another reason they have shore-based jobs. Some had to change their previous dream while the health of others went bad. The longevity of a ship's officer is indeed an important factor, one which goes beyond the bounds of his personal interests.

My years of training at the navy school, where I matured as a sportsman also, developed in me a love and respect for physical culture plus the personal requirement that I must always be, as they say in boxing, in fighting form. Aboard ship, naturally, the possibilities for properly engaging in sports are sharply limited. Although we young officers were up over our heads in work involving the mastery of equipment and the training of our subordinates, we did not neglect physical culture. All the more since our senior comrades

had a respectful attitude toward sports and an exactingness toward the physical hardening of ship's personnel and we could feel it. My first ship's commander was N. Pashkov, now a vice-admiral and chairman of the Committee on Sports of the Ministry of Defense USSR. He and other senior officers under whose command I have served demonstrated at sea their fortitude and inexhaustible strength. They served as an example to us while requiring from their subordinates excellent physical preparedness.

If I were to search back in my memory for those ship's commanders who were well known to me it would be very difficult for me to recall any officer on that level who had an equivocal attitude toward his physical condition. The very same Nikolay Aleksandrovich Pashkov was an exceedingly versatile sportsman and an excellent volleyball player. That famous submariner Hero of the Soviet Union Admiral A. Mikhaylovskiy was keen on gymnastics and swimming and attained the rank of a leading sportsman. Also up there in the leading ranks of sports was Hero of the Soviet Union Admiral V. Chernavin. Not only they but many other commanders in their youth were enthusiastic about sports and have always maintained a need for regular physical training. This is indeed the best possible example for young officers. It is a convincing demonstration that the longevity of a ship's officer is the result of a strong spirit within a strong body.

Yes, the foundation of health, of ship's officers' longevity is laid down in youth. And the more solid and more basic that foundation is, the more reliable and durable the internal energy resources of a man are, the easier it is to strengthen and support them later, despite age. Take for example Captain 1st Rank G. Malyshev who recently transferred to a shore base--he is an officer whose longevity aboard ship can be regarded with amazement and envy. An excellent sportsman during his youth, he spent virtually all of his years as an officer, as the submariners put it, solid of body. There never rose even a shadow of doubt as to his physical fitness for continued service aboard ship.

There are instances when capable and professionally dedicated submariners are compelled to leave their ships earlier than they want to because of an inconsistency between their physical "condition" and their many-faceted obligations as an officer. I recall how Lieutenant Yu. Bondarenko and I began our service aboard submarines together. Those dreams of his, connected with the ship, unfortunately were never realized. After a short period at sea, the young officer was transferred to shore by our doctors.

It goes without saying that not all of us are granted faultless health from birth. I, for example, grew up as a weak lad. That is precisely why, at age 11, my father enrolled me in training as a boxer. My father was not wrong; that sport not only gave me health but enabled me to acquire qualities important to an officer, such as will, purposefulness, plus the ability to subordinate one's thoughts and actions to a given task. I say that not to praise myself but for the purpose of underlining this fact: for a man who is healthy but who does not possess these qualities in sufficient measure it is extremely difficult for him to overcome the difficulties and privations of a military life.

It is well known that it is impossible to achieve good results in sports without constant control of one's self, the ability to limit one's self, to avoid harmful habits and temptations. This is what military service requires, particularly that of our service as submariners. Spending several weeks in the solid hull of a ship isolated from the regular world in the depths of the sea--that alone is a serious limitation upon a man. Yet one is called upon to work at a higher degree of productivity, to maintain one's spirits, and to build up correct mutual relations with people. The internal discipline peculiar to man is augmented by sports and is a good ally.

Over the years of my service I have become deeply convinced, this on the basis of practical experience, that people engaged in sports find it easier to overcome physical and psychological burdens. Not only that, but they are able to derive a deep moral satisfaction by so doing: their time is their own, including that devoted to rest, and they use it in a more interesting and rational manner, they are more equable and steadfast in dealing with their comrades, and the problem of psychological compatibility less often arises in them. Special scientific observations testify to the fact that the organism of a physically developed submariner is more stable against the force of unfavorable factors than is the organism of persons without any physical training.

It is traditional for people to be selected for service with the fleet who are healthy, strong and hardy. Combat has always required of our seamen the application of great physical force. Now, the muscular effort required of a person aboard ship, particularly aboard a nuclear submarine, is minimal. But, however paradoxical it may seem, the physical effort of modern combat requires immeasurably more. It is necessary to the seaman for intensive and long mental labor, for complex operations, for the capability to maintain clearness of thought and both precision and speed of action under any situation.

Submarine Simulator Training

Moscow KRASNAYA ZVEZDA in Russian 26 Dec 81 p 1

[Article by Lieutenant A. Rozhnov: "Training Has Become More Effective"]

[Text] Red Banner Pacific Fleet. The training of ship specialists at the training center of the N-th Submarine Unit is proceeding with a high degree of effectiveness. Shore-based simulators enable specialists to work out problems involving the introduction of various kinds of data.

A substantial contribution toward improvement of the training-material base has been made by subordinates of Captain 2nd Rank V. Azhnakin. Thus, Master of Military Affairs Warrant Officer N. Bulgakov has constructed an original simulator of ship rolling which permits making observations under conditions close to reality. Quite a few valuable innovations can be credited to Captain-Lieutenants Ye. Getmanskiy and S. Kokurin and to Petty Officer 2nd Class V. Sifatullin. Their devices facilitate an increase in training effectiveness, the reliability of operation of training equipment and an increase

in the duration of their utilization, which results in considerable savings as to material and electric power.

Torpedo Simulator Training

Moscow KRASNAYA ZVEZDA in Russian 5 Jan 82 p 1

[Article by KRASNAYA ZVEZDA Correspondent Captain 1st Rank N. Remizov: "An Unaccounted For Factor"]

[Text] Present in the training room are cadets from the School for Technicians of the Red Banner Underwater Navigation Detachment imeni S. M. Kirov. This day they are undergoing training on the practical servicing of torpedo apparatus.

Within the not too distant future, the cadets of the school for technicians will become the close assistants of officers. That is why it is important that every training exercise with them not only increases their special training but that it inculcates in them definite methodological habits and develops an ability to direct subordinates while at sea and in combat. In consideration of that fact, the instructor, Senior Lieutenant-Engineer A. Voronin, decided to organize the training of the cadets in the following manner. He divided the group into several crews and appointed the senior seamen within them. Then he had these senior seamen changed periodically so as to give every man an opportunity to serve as senior seaman.

In this manner, training began. The cadets set to their work on the equipment. It was evident that they had begun their training in a good frame of mind and with interest in their work. It would seem then that things would proceed on an upward note. All the more since Senior Lieutenant-Engineer A. Voronin had done a great deal toward achieving that end. One had the impression that he had good mastery over the training materials, that he was striving to carry out the training with a methodological literacy, and that he was following the principle of "moving from the simple to the complex." At the beginning, the cadet crews learned to make an outward inspection of the mechanisms, to check the position of moving parts, then moving on gradually to working out activities directly connected with firing and with bringing the torpedo apparatus back to its starting position.

Yet the "glow" of this combat training did not expand but, alas, seemed to diminish. One could even see that the activity of the seamen was becoming more and more sluggish. This was particularly true of the people who were being entrusted with heading the crews. Many of them functioned with insufficient initiative and failed to do everything possible to develop the habits of command in themselves.

Why did this happen? One of the basic reasons, in my opinion, was that the spirit of competition was missing from this training exercise. Every one of the cadets had undertaken for the new school year specific socialist obligations aimed at improving his combat training. Senior Lieutenant-Engineer A. Voronin, however, did not consider it necessary to remind them of this. Nor

did he remind them of norms or concern himself about timing the activities of the cadets. Is it any wonder then that, in the end, the cadets became bored with the mechanical fulfillment of one and the same operations. There was no way for them to really know whether their work performance was improving and were not afforded the opportunity of visually comparing their results with those of their comrades.

The following example is characteristic. It was the idea of the instructor to have the cadet fulfilling the role of the senior seaman give a brief analysis of the work of the crew and to come up with an evaluation of the work of each crew member following completion of one or another operation. It is an interesting methodological approach, no doubt about that. Voronin, however, did not manifest the proper consistency and persistence in carrying out that method. For example, one of the crews is completing its work on the torpedo apparatus.

"What observations does the senior seaman wish to make?" the officer asks of Petty Officer 2nd Class V. Yefimchik.

"Everything is normal," the crew chief replies curtly. With that the entire "analysis" is exhausted.

Another crew is winding up its work. The floor is given to Senior Seaman A. Ul'yanov. The same story is repeated. The senior seaman shrugs his shoulders: "Everybody did his work well."

Granted that at this point it is difficult for the cadets to note all the pluses and minuses in the activity of crew members and to poke deeply into the reasons for them. It is at this point that the instructor should demonstrate how things should be done, to teach the cadets to give an exacting evaluation to the crew members, and to sum up the results of their joint work in a serious and objective manner. Unfortunately, this he did not do. More than that, when he himself conducted the final critique of the training exercise, he followed virtually the same path--he did not give a specific evaluation of every member of the crew and limited himself to general statements. All of this undoubtedly lowered the quality of the training and of its instructiveness.

I have concentrated upon a specific episode and have discussed only one training exercise. Behind these stated facts, I think, lies a serious problem, one which is characteristic of not just this particular training group. As yet, it is not everywhere that proper concern is manifested about conducting every instruction session, every training exercise in the spirit of competition. For it is competition which is an important factor in increasing the activity of military personnel in combat training. We should not fail to consider it.

Nuclear Submarine Training

Moscow AGITATOR ARMII I FLOTA in Russian No 23, Dec 81 (Signed to press 13 Nov 81) pp 6-7

[Article by Captain 3rd Rank V. Shirokov of the Northern Fleet: "An Examination at Sea"]

[Text] The missile-bearing submarine slowly approached the pier. The mooring lines have been passed. The band has burst into a tune. Captain 1st Rank G. Nikitin has come down the gangplank and has reported to a senior officer in the line of command.

The report consists of only a few austere and laconic phrases. It was almost as though the thousands of miles at sea through whose depths the submarine had traveled did not exist, that there had been no complicated combat training tasks which had been fulfilled with excellence, that there had been no sleepless, difficult nights on watch. Way out at distant meridians the submariners had polished away at their combat training, had verified the coordination of their calculations, the solidarity of the crew.

While they had been back at the base, long before the mooring lines had been cast off, the commander had worked out, this together with party and Komsomol activists, the conditions for competition between battle watches and the popularization of leading experience. Thus, for example, no one could remain unmoved by the proposals for competition at maintaining the best watch while at sea. Many factors were taken into consideration when doing this: maintenance of compartments, mechanisms and weapons, fulfillment of the orders of the day, the initiative and industriousness of every submariner on watch, the ethics of mutual relations within the collective, the work of the agitators and of the editors of the wall newspaper. The competition schedule was posted in the main control room; placed on it every day was an evaluation of the work of every submariner plus an overall grade for the watch as a whole.

Results of the sea cruise showed that the winner was the combat watch to which Captain 3rd Rank V. Sazhin belonged. What was the secret of success of this collective?

Above all, it was the fact that every submariner in it executed his watches at sea in an exemplary fashion, that he actively participated in both general and innovative work, plus the fact that mutual aid was well carried out. Mobilization of the crew toward a qualitative fulfillment of assigned tasks in the long sea cruise by volunteer propagandists and agitators assisted the watch officer in that regard.

We must add here that Master of Military Affairs and party member Warrant Officer V. Yevdokimov distinguished himself in carrying out his watch duties. Party activists told the entire crew of his experience in both the wall newspapers and in their radio news broadcasts. They followed this up by organizing a general exchange of experience session.

Or take this fact. On the eve of the ship's departure for sea the crew was supplemented with several young seamen. It was necessary to train them to carry out their watch duties within a short period of time. Here the ship's party and Komsomol activists had the first word. The proposal was made at an open party meeting to have experienced specialists organize assistance to these young seamen in all battle sections. The question was put rather specifically: every party member was to prepare two of the new crew members to pass their examinations for the next rating. This initiative was widely supported.

Work with warrant officers was set aside separately during the trip at sea. The decision was made that, during the year of the 26th party congress, every warrant officer was to become a master of military affairs or a high-class specialist.

A plan was drawn up for training warrant officers over the entire course of the cruise period. The plan made provision for questions connected with the mastery of equipment, study of the ship, acquisition of repair skills, and experience in the training and education of subordinates. Results were summed up every day of the trip. This training of warrant officers had a double strength.

All this effort was repaid one hundred fold. At the present time, more than one-half of the warrant officers of this missile-bearing submarine are masters of military affairs.

There was a notable improvement during the course of the voyage in the tactical and special training of our officers. Training courses for them were organized during every battle watch.

From this long-range trip a qualitatively new crew returned, a crew inspired both morally and physically. All battle sections and services moved up to the excellent level. The ship's activists are entitled to a great deal of credit for this.

In the new training year our submariners await new tests--both complex and strenuous. The crew will apply all of its efforts to making an even greater contribution toward fulfillment of the historic decisions made at the 26th party congress.

9643
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TABLE OF CONTENTS OF 'REAR SERVICES AND SUPPLY OF SOVIET ARMED FORCES,' DECEMBER 1981

Moscow TYL I SNABZHENIYE SOVETSKIKH VOORUZHENNYKH SIL in Russian No 12, Dec 81 (signed to press 16 Dec 81) p 2

[Text] Contents

9887
CSO: 1801/134

TABLE OF CONTENTS OF 'REAR SERVICES AND SUPPLY OF SOVIET ARMED FORCES,' JANUARY 1982

Moscow TYL I SNABZHENIYE SOVETSKIKH VOORUZHENNYKH SIL in Russian No 1, Jan 82 (signed to press 12 Jan 82) p 2

[Text] Contents

9887
CSO: 1801/134

FRENCH SOURCE ON SOVIET CIVIL DEFENSE

Paris EST & OUEST in French Mar 82 pp 17-21

[Article by Jean-Pierre Brule]

[Text] France, from the days of de Gaulle until Giscard's time, has maintained a perilous continuity in its opposition to providing shelters for its people, using the pretext that anti-population defensive deterrence would be endangered if a possibility of survival were offered the civilian population. But the USSR, on the contrary, although overarmed with nuclear weapons, combines civil defense with its military strategy, making civil defense the most important component of its national defense.

The European press, while continuing to list the efforts of the Peoples Republic of China in constructing shelters and tunnels to be used in the event of war, has maintained a strict silence about the very same preparations in the USSR and in the Warsaw Pact countries, which have implemented a civil defense organization that completely parallels the Moscow structure. For this reason, in this article we will just report on the organization of civil defense in the Soviet Union.

A Tangible and Institutionalized Reality

The purpose of civil defense in the USSR is to ensure that the largest possible part of the population will survive a massive nuclear attack, and to preserve the political and economic apparatus required for a prolonged war effort, in order to enable the Kremlin to emerge victorious from a large-scale future nuclear conflict, which the Soviet strategists do not consider suicidal, as we reported in a previous article[1]. The nuclear "factor" has actually transformed the very concept of defense. While it is still soldiers who make war, it is the civilians who will now bear the effects of it.

The days are past when defense seemed to be the monopoly of the military. It now involves all the nation's activities. As Colonel Ryabchikov reported: "Based on the role that civil defense is required to fulfill in the Soviet Union, our civil defense system must assume the following essential duties: the protection of the population against massive destruction weapons; protection of economic institutions, in order to maintain their regular operation in case of an enemy attack; and the conducting of rescue operations and urgent repairs in damaged areas." (SOVIET MILITARY REVIEW, no 2, 1977).

Civil defense, which is the direct heir of the earlier passive and anti-aircraft defense organizations, which were subject to the authority of the ministry of the interior, began a thorough reorganization process in 1961. This was initiated by N.S. Khrushchev, though he did not have time enough to complete it. So it was under L. I. Brezhnev that civil defense became a tangible and institutionalized reality, and had its extraordinary development, to the point that today it involves the entire Soviet population of 266 million inhabitants.

Civil defense in the Soviet Union is a centralized organization attached to the minister of defense. To handle this command effectively, the minister of defense appoints a civil defense chief who is given the title of vice minister of defense, and who is a member of the Supreme Military Council presided by L. I. Brezhnev. (For the reader's information, it is only on this council that military leaders serve along with political leaders, but final decisions rest with the party's Politburo, on which no career military officers serve. To use a formula often cited by Mao, "The party controls the rifles").

The civil defense chief is always a general officer (at present, this post is held by Army General A. T. Altunin), who is supported by a special staff called the civil defense staff. The same organization is carried over to subordinate levels: at the head of the 15 military regions covering the Soviet territory, there are 15 generals given special responsibility for coordinating the deployment of the immense reserve forces (5 million men who have served in the armed forces during the last 5 years and 20 million men who are required to take part in periodic training until they reach the age of 50). This general officer has a specialized staff. The territorial organization is repeated down to the basic administrative division[2], where civil defense is directed jointly by the civilian chief of the appropriate administrative echelon, and by a military officer.

Within collective organizations (enterprises, industries, etc.), civil defense has a special organization related to the nature of the activities involved. The civil defense chief (generally a reserve officer) is assisted by the personnel required for the defense of the work unit, and this officer is responsible for taking the specific technical measures required to perform this mission. This basic system is used hierarchically up to the various ministries involved (agriculture, industry, health, education, etc.).

Preparing the Population for the War Effort

To carry out its assigned duties, civil defense has vast human resources. Civil defense military units led by active-duty officers and non-commissioned officers (wearing special uniforms) are used full time and are located throughout the Soviet territory. These are reinforced by mobilization units, formed from enterprises or other collective organizations, and which receive regular training as part of their normal activities.

A military civil defense school, whose first class graduated in 1969, is located at Balachikha, 27 kilometers from Moscow. This school, which is operated jointly by the ministry of defense and by the civil defense command, after a 3-year course of study, graduates technicians who, upon passing an examination, are given the rank of second lieutenant. Along with major Soviet organizations, such as DOSAAF [Voluntary Society for Cooperation with the Army, Aviation, and Fleet][3], KOMSOMOL [Communist Youth League][4], and the unions, these civil defense officers are responsible for introducing young Soviet citizens to the civil defense activities established in 1966. Civil defense theory is studied in class; it was made compulsory by L. I. Brezhnev in secondary schools and in general education.

The young Soviet citizens are taught methods of self-protection by means of practical exercises that can be used wherever they may be (at home, in school, in the fields, factories, shops, etc.). For example, young city dwellers are trained in organizing rescue operations and in making factories less vulnerable, while young rural people are taught to protect livestock. Everyone learns to operate cranes, bulldozers, and all types of heavy equipment in order to be able to free people trapped by bombing, to fight against fire (in the field of fire prevention, the Soviets have had excellent results: there is an average of one fire for every 10,000 inhabitants, compared with 31 fires in Great Britain), to give first aid to the wounded, and to handle rapid removal of the wounded to the nearest medical center.

Everyone is also trained in the identification of special alarm signals (air warning alerts, radioactive contamination alerts, chemical attack alerts, bacteriological contamination alerts, etc.). In summer camps, the secondary school students put into practice the lessons they have been taught. These civil defense exercises are also broadcast on television. As the "technique" of civil defense is assimilated during peacetime, in case of a conflict there is no need to resort to improvised measures. And in fact, the civil defense program is not studied strictly with military purposes in mind. It is also used during peacetime to cope with disasters and catastrophes of either human or natural origin (for example, during the summer of 1972, against the vast forest and peat fires, and again during the earthquakes in Bukhara and Gazli, in May 1976).

For people no longer in school, that is, those who left school and began civilian life before the establishment of the compulsory civil defense program in schools in 1966, the introduction to civil defense activity is provided for workers, kolkhoz [collective farm] members, and office workers within their work units. Competitions are held between workers, with prizes awarded to the winners. Those who neglect their civil defense activity find their names held up for public scorn in the press. As for the nonworking population, such as children and retired people, the necessary knowledge is imparted on the radio, in movie theaters, and on television. In short, civil defense is used as a means of conditioning the entire population and preparing the people for an intensive war effort.

A Major Shelter System

As Colonel Ryabchikov said in the military journal we quoted earlier: "The essential task of civil defense is naturally to protect the population against massive destruction weapons. This task will be accomplished by dispersing and evacuating workers and employees into suburban areas, and by making shelters and individual resources available to the people. The major principle guiding civil defense is full conformity of its organization with our national imperatives in peacetime and in wartime, and the ability, at the start of a conflict, to carry out the tasks assigned to us without significantly altering our peacetime structure."

The protection of the civilian population is in fact based on providing shelters and evacuating urban population groups. The USSR has only nine cities with 1 million or more inhabitants (in all, a total of approximately 20 million people). The construction of shelters can ensure the survival of the largest part of

the population, at least of the civilian population[5]. For the Kremlin, whatever was not done at the right time can never be made up later. All new buildings are required to have shelters. Special shelters are now being prepared in the basements of older buildings. These are not just simple, light shelters affording more protection against conventional weapons or the secondary effects of a nuclear attack than against a close impact. These shelters are designed to withstand warheads of impressive magnitudes and blast effects as well.

Each shelter is checked by a special commission. If the shelter is located in an apartment building, it is turned over to the residents, and one of them must list in a special register the condition of the shelter, in which the "temperature must be kept at 15°C when the humidity is 70 percent." If not, the site must be dried by some ventilation or aeration system. In no case can a shelter be used for housing or for storage. The USSR today has a major infrastructure of underground shelters: for decision-making centers (110,000 spaces); for essential workers in key industries (2 million spaces); and for urban dwellers required to remain in the city (15 million spaces). A widely disseminated and fully illustrated manual gives complete directions for building an individual shelter and also explains how to protect oneself against radiation, and for group shelters, tells how to improvise air pumps to filter radioactive air, etc. In short, the Kremlin plans above all to create a climate of total safety, and not to install a feeling of false security.

But shelters alone are not enough to preserve life. So the authorities use information resources in order to involve everyone in this civil defense effort. And first of all, to keep the people informed about the effects of modern weapons and rescue means. Small broadcasting stations have been created as reserve operations throughout the USSR in case a central transmitter is destroyed. Each station has technicians ready to start it operating at a moment's notice. In order to keep this emergency network working, personnel relief programs have been established if circumstances should so require. In a similar way, the alert system has been highly developed: sirens independent of the electrical power system and the telephone system are located everywhere. For in case of a conflict, the telephone and electrical systems might quickly become unusable. The people are periodically given training in identifying the essential warning signals[6]. Civil defense problems are regularly communicated to the people in pamphlets or in publications released by Military and Atomic Publications, and at regular intervals, by the centralized party press (PRAVDA), by the

government press (IZVESTIYA), and by the army press (KRASNAYA ZVEZDA).

The Most Important Component of National Defense

The providing of shelters for urban residents who must remain in the city, and the preparation of the population as a whole for civil defense are also accompanied by plans to evacuate cities and industrial centers to the countryside. This evacuation of the urban population has been covered in detailed plans and exercises. Dispersion plans involve both total and partial movements, and may apply to a single locality or all relocation areas at the same time. Civilian evacuation plans specify assembly points: each convoy is then accompanied by a doctor and a nurse. A special civil defense transport service has also been organized, which operates outside of the present road, rail, air, and maritime services. In the cities, the Soviet citizens--even those without evacuation orders--are required to apply personal precautionary measures (emergency baggage, gas masks, clothes made of insulating fabric, protective clothing and gloves, the formation of food reserve supplies, etc.).

The full extent of the Soviet territory is included in these plans: each locality is required to apply the civil defense regulations issued by the Kremlin; this is, of course, greatly facilitated by the system of absolute state control. Food ration cards have already been printed and are kept in reserve in municipal agencies. Civil defense exercises are conducted periodically in a situation of artificial emergency that is made as realistic as possible, at the state, enterprise, commune, or administrative subdivision level. General exercises also take place on the provincial level, involving the entire population, civil defense active and reserve units, police, militia, fire protection, and Red Cross services, as well as pre- and paramilitary organizations.

Special efforts have been made to ensure the survival of the industrial production resources of the USSR: these include dispersion, shelters for personnel, direct protection of the facilities, the formation and maintenance of protected, permanent war supplies (raw materials, machines, food supplies, munitions), so that there will be no delay in combat. Hospital services are backed up the establishment of underground facilities (hospitals, operating rooms, medical centers, etc.). There are also underground factories, and similar facilities. This establishment in peacetime of the elements of a wartime economy is quite obviously facilitated by the nationalization of all of the country's resources, by the planning of industrial

production, and by rural collectivization. This state control greatly facilitates the nation's economic preparations for war. So, starting in peacetime, all the people are placed on a war footing with this system of total civil defense which maintains the value of the mobilizable units, by keeping their potential and power up to the desired level.

In this way, 20 years after its establishment in an institutional framework, Soviet civil defense has come of age. The USSR allocates 2 percent of its military budget for the development of this prime deterrent instrument. In 1982, France is spending on civil defense 0.14 percent of its total military budget, according to Senator Christian Poncelet, special analyst of the General Secretariat for National Defense budget (Senate report no 58 of 23 November 1981). In other words, the share allocated for civil defense in France is 200 times less than in Switzerland, 55 times less than in the Federal Republic of Germany, etc. In such circumstances, there should be nothing surprising about the fact that Paris has no atomic shelter for its people! In Sweden, the population is protected to a level of 88 percent, in Switzerland the rate is 80 percent, and in Norway the rate of protection is 42 percent! That should be enough to make us think.

Civil protection maximizes the population's chances of surviving a conflict involving massive destruction weapons. But this reduction of the risks entailed--the "Civil Defense Manual" (Moscow, 1969) estimates that the evacuation and dispersion of the population would limit civilian losses to about 5 or 8 percent of the total population--may encourage the USSR to think that the cost in human terms, in the event of a nuclear conflict, would be "acceptable." In short, its impressive civil defense program, which testifies to its intent to have its nation survive, may lead the Kremlin to think one day that it could launch a nuclear attack against West Europe with relative impunity. In this way, in the USSR, civil defense, with its corollary, defense of the economic structure, has actually become the most important component of its national defense, a pillar of the entire defense system.

In these times of potential conflicts, when all problems have now become worldwide, and when every country may be drawn into a war that could begin anywhere in the world, all the western nations would be wise not to ignore this factor. Only clear-sighted vision in defense matters will enable us to be prepared to "deal with the unforeseeable." For it is in the logic of any aggressor to attempt a surprise attack.

FOOTNOTES

1. "Soviet Military Strategy," EST & OUEST, no 660, January 1982.

2. For administrative purposes, the USSR has 15 Federated Republics, and among its territorial echelons, there are: eight territories, 14 regions, 2,926 districts, 1,933 cities, 452 urban districts, 3,467 towns, and 40,907 villages.

3. The DOSAAF is an organization whose responsibilities include military preparation and training on a joint-service level, anti-aircraft defense, internal defense, and anti-nuclear defense. The DOSAAF is in fact an auxiliary and an actual "pool" for the army, whose power it augments by improving instruction for its future soldiers. It has about 80 million members, which is a little over a third of the total population of the USSR.

4. The Komsomol is the sole youth organization of the USSR. It serves as a sort of conveyer belt between the party and young people, but also as a breeding ground for future party members. The Komsomol has 25 million members (between the ages of 14 and 28), to which number we should add about 23 million Pioneers (children between the ages of 7 and 14), placed under the direct control of the Komsomol.

5. The nations that base their policy on a nuclear force have shown their intentions of using it by providing shelters for their population: the USSR, the Peoples Republic of China, and the United States (which has a 5-year plan with a budget of $2 billion). France is the only one that still supports the Gaullist idea that protecting the population diminishes the credibility of the strike force! While World War I caused several million military deaths and about 500,000 civilian victims, this ratio has been reversed in conflicts since 1954. The Korean War, for example, killed 5 times more civilians than military, and in the Vietnam War, 20 times more civilians were killed (3 million) than military deaths (150,000 men).

6. People who read the Parliamentary Documents in France must certainly have been surprised by the report by the Deputy Christian Pierret (National Assembly, no 470) on civil defense in France: "The structures are in accordance with regulations. 75 percent of the cities with more than 4,000 inhabitants have sirens connected with general alarm systems in rural areas which use the telephone system... The national automated data system for radioactive fallout is now being extended...

While, according to the deputies, everything is "in accordance with regulations," the senators have quite a different opinion! In the memorandum from Senator Paul Girod (Senate, no 63), we read that we should "replace 1 million sirens that are over 40 years old. These sirens are dependent on the electricity system and telephone lines, and are consequently exposed to the same risks as these systems... We should realize that 1,200 stations (of the 2,400 existing stations) of our detection system for ground radiation are now gradually breaking down... It would be desirable to increase the number of teams monitoring radioactivity levels. This number should be raised to one per canton (there are now 250 in an operational status)."

7679
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PERCEPTIONS, VIEWS, COMMENTS

TABLE OF CONTENTS OF 'ZARUBEZHNOYE VOYENNOYE OBOZRENIYE', JULY 1981

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 7, Jul 81 (signed to press 8 Jul 81) pp 1-2

[Full-text translated articles published in this JPRS report are indicated with an asterisk; excerpted translations - with a double asterisk.]

[Text] CONTENTS Page

The articles by Soviet authors and the chronicle were prepared from material published in the foreign press. This issue contains illustrations from the reference book "Jane's," the magazines AVIATION WEEK AND SPACE TECHNOLOGY, AVIATION AND MARINE, ARMADA INTERNATIONAL, ARMIES AND WEAPONS, DEFENSE, INTERNATIONAL DEFENSE REVIEW, COMMANDER'S DIGEST, NAVAL AVIATION NEWS, NEWSWEEK, FLIGHT, FLUG REVUE, STERN, AIR INTERNATIONAL, AIR FORCE, AIR AND COSMOS, OSTERREICHISCHE MILITARISCHE ZEITSCHRIFT, and the newspaper WAFFENBRUDER.

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SOVIET COMMENTS ON MODELLING COMBAT OPERATIONS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 7, Jul 81 (signed to press 8 Jul 81) 18-21

[Article by Candidate of Technical Sciences Eng-Col V. Pavlovskiy: "Taking the Element of Surprise Into Account for Modelling Combat Operations"]

[Text] Militaristic circles in the West continue to foment military hysteria. They are increasing outlays for continuing the arms race, stepping up the development of new strategy, perfecting theories of operational art and tactics and making a study of patterns of combat operations. Recent events, the CPSU Central Committee's Accountability Report to the 26th party congress stresses, have confirmed over and over again the fact that our class enemies are learning from their defeats. They are operating against the socialist nations in an increasingly refined and treacherous manner.

One of the focuses in the development of the theory of armed conflict consists in studying the experience of past wars as a basis for establishing quantitive valuations for those factors whose influence upon the outcome of combat operations has long been known. One example: The side which begins combat operations unexpectedly has certain advantages. Just what are these advantages, though? To what degree can they be relied upon for planning combat operations and working out the plan? In order to answer these questions we need to know how the effect of surprise is expressed numerically and how the balance of power is affected by unexpected operations.

The foreign press underscores the fact that theoretical research into the surprise element, which determines to a significant degree the outcome of an operation (combat operations), is especially important today, when methods of automated assessment of the situation and automated development of plans are being adopted more and more extensively in the practical work of staffs. Since this can only be accomplished by means of mathematical models of the process of combat operations, all of the basic factors influencing the course of those operations must be expressed numerically (mathematically). Numbers have to be manipulated in order to use electronic computers for forecasting probable outcomes of a forthcoming engagement with a specific variant of a plan or for working out another plan, the most acceptable one.

In recent years the American Organization for Historical Research and Assessments has studied the patterns of combat operations at the tactical level (division-corps), including battles of the past. It has achieved a certain amount of success in this matter. Although the studies have not been completed, results have already been achieved,

which, in the opinion of American military circles, including the Joint Chiefs of Staff, are important with respect to developing the theory of military art.

Contrary to the opinion previously held by foreign specialists that the course of a battle (or engagement) is subject to the "square law" (it is ordinarily called the Lanchester law in the West, although it was actually established by M. Osipov, a Russian officer, in 1915), the studies have brought out the following fact. The "square law" takes into account only the quantity and the quality of weapons on both sides, whereas the outcome of a battle (or operation) depends--and to a considerable degree--upon other factors such as the commander's art and the resistance (morale) of the personnel. Studies have shown that they increase (or decrease) the balance of power, as it were, as calculated strictly on the basis of the quantity and quality of the weapons on the two sides. In other words, they adjust this ratio, which has always been considered the basis for assessing the situation.

Initially it appeared that neither of the above factors lent itself to quantitative valuation, and it was therefore necessary in the course of the studies to determine whether the "square law" remained valid when the combat characteristics of the weapons and the tactics used by the troops were altered. For this purpose hundreds of battles fought between 1806 and 1973 were studied in detail.

The results were described by most foreign military experts as "surprising" and "questionable" and subjected to sharp criticism. One conclusion drawn by the authors of the studies stated that the "square law" was unsuitable for predicting the outcome of an operation, a second maintained that the historical patterns were stable and did not depend upon the use of new weapons or the improvement of tactics. Experience (particularly a study of the military conflicts in the Near East in 1967 and 1973) showed that both conclusions were correct.

The methods used for performing the studies were the following. First of all, two basic formulas were devised for making the calculations: one for determining the ratio of the combat capabilities of the sides (combat strength criteria), the second for determining the effectiveness of operations carried out by the sides from the standpoint of casualties.[1] It was assumed that if the balance of combat capabilities (the quantitative and qualitative balance of power) was greater than "1" for the target side (that is, the side in the interest of which the calculations were being made), it was more powerful than its enemy and consequently it should suffer fewer losses. The study showed that there were two kinds of exceptions to this rule: clearly systematic in some cases and apparently random in others.

A selective study of operations conducted during World War II, during which the American or British troops fought under conditions relatively similar to those of the German fascist troops and were of equal strength, established the fact that the difference in casualty levels indicated a 1.2-fold quantitative superiority for the Germans. This figure was the relative coefficient of strength for the German army. Therefore, in order to achieve the correct result, the reference balance of power had to be reduced by that degree when the calculations involved the American (or British) army and increased by the same amount when it was the German army.

This conclusion made it necessary to replace the single concept "balance of power" with two: reference balance of power and effective balance of power. The value for the

1. ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No. 6, 1978, pp 21-25.--Editor

effective balance of power was accepted as suitable for forecasting the probable outcomes of an engagement.

The next stage in the study of patterns of combat operations based on historical assessments was the study of "random" and significant deviations in the results of engagements from the theoretical conclusions, which were considered to be natural in accordance with the selected criteria of effectiveness (the ratio of combat capabilities and the difference in casualty levels). It turned out that these deviations were in fact not random but perfectly natural, and their extent always corresponds to the use of the element of surprise by one of the sides. It was established that the combat capability of that side was increased, as it were, approximately 1.8- to 1.9-fold.[2] The increase was considerably greater in certain cases. This phenomenon was interpreted by the researchers along with the experts (officers with experience in the field) as different degrees of influence of the element of surprise on the outcome of an engagement (3 degrees of influence were suggested: low, medium and high). The value which indicated how much the reference balance of power had to be increased was called the surprise factor (F_s). The study of these issues brought out the fact that the effective strength ratio (R_{es}) should be considered as the product of the reference (quantitative and qualitative) strength ratio (R_s), the relative stability coefficient (C_{rs}) and the surprise factor, that is, according to the formula $R_{es}=R_s \times C_{rs} \times F_s$.

For example, the military experts using this formula considered that when Hitlerite troops with a 1.1:1 ratio of strength ($R_s=1.1$) unexpectedly ($F_s=1.8$-1.9) attacked the enemy--American and British units--the reference effective strength ratio ($1.1 \times 1.2 \times 1.9$), considering the Germans' stability coefficient (C_s) was 2.5 and in certain cases even greater. They maintain that the outcome of a battle (or engagement) should be forecast on the basis of this value. The opponents of this system did not agree with the calculations made, however, stating that all of this amounted to simply making things match up, since the results obtained were only valid for wars of the past and were totally unsuitable for modern wars. Their only justifications for this point of view were "common sense" and assertions that the "square law" was being violated.

Instead of refuting such opinions, some Pentagon leaders considered the mathematical model KOM--"Quantative Assessment Model" (Quantified Judgement Model[QJM], also sometimes called "Numerical Assessment Model")--to be unsuitable for resolving practical problems. It was unofficially used by the U.S. Defense Intelligence Agency, however, which, by agreement with the Organization of Historical Research and Assessments which worked out the QJM, analysed all the engagements occurring during the Arab-Israeli wars of 1967 and 1973. Those wars were also analysed by means of all other models "possessed by the military." As it turned out, only the QJM produced results which corresponded almost totally with the reality (more than 88% of the outcomes of engagements predicted with this model coincided completely with the actual outcomes). Despite their adherence to "mathematical strictness," none of the other models accomplished the assigned task. Some of the results of a study made using the QJM have confirmed the fact that the side for which the value for R_{es} is greater than "1" wins the battle, and the side for which this value is less than "1" loses (see table).

To facilitate reading the table the attacking forces are taken as the target side in all cases. The above formula produces a single number instead of the two numbers ordinarily given in notations indicating strength ratios. When the target side has a double superiority, for example, the answer derived with the formula is recorded as 2 and not 2:1, and as 0.5 and not 1:2 when the enemy has a double superiority.

2. Figures taken as the average value for the surprise factor from the table, which reflects the experience of 17 encounters of the Arab-Israeli wars.

Analysis of Arab-Israeli Wars of 1967 and 1973 Produced by Means of the QJM

Area of combat operations	Attacking side	Coefficients				Victorious side (forecast and actual)
		R_s	C_{rs}	F_s	R_{es}	
1967						
Rafa	Israel	1.13	1.87	1.98	4.19	Israel
(Abu Adzhela)	same	0.56	2.69	2.07	3.12	same
Jerusalem	same	1.71	1.58	same	2.70	same
Jenin	same	1.98	1.57	same	3.10	same
(Kvala)	same	1.79	2.50	same	4.47	same
(Tel Fakhr)	same	1.34	3.34	same	4.47	same
1973						
Ismailia (assault crossing of Suez Canal)	Egypt	0.83	1.17	2.35	2.28	Egypt
Suez (assault crossing of Suez Canal)	same	1.00	1.11	2.33	2.58	same
Ismailia (offensive)	same	0.75	1.25	1.67	1.56	same
Suez (offensive)	same	0.76	1.30	1.67	1.69	same
(Bir-Bart-El'-Khegaymb) (Israel's counterthrust on 8 October)	Israel	0.52	1.87	0.60	0.58	same
Ismailia (Egypt's offensive of 14 October)	Egypt	0.67	0.51	same	0.34	Israel
(Es-Shatt (Egypt's offensive of 14 October)	same	0.74	0.51	same	0.38	same
Ismailia (Israel's assault crossing of canal)	Israel	0.76	1.96	same	1.80	same
(Chaynz Farm)	same	0.85	3.05	same	2.60	same
(Amedey)	Syria	0.62	0.65	1.40	0.56	same
(Rayfid)	same	0.89	0.75	2.10	1.40	Syria

Note: The QJM predicts success (victory) if the ratio of effective strength is greater than "1" and failure (defeat) if it is less than "1." The table shows that the forecasts made by means of it proved to be totally correct.

The foreign press underscores the fact that the general course of events in the 1973 war was predicted in advance (before the beginning of combat operations) and the prediction proved to be totally correct, nullifying all the objections of the critics. The QJM, previously rejected for the above-stated reasons and as a result of its apparent simplicity, was adopted for practical use. A special mini-computer was developed to make it convenient to use the model. In the opinion of American military experts the QJM is a powerful means of forecasting the outcomes of operations for the American command. They therefore consider it perfectly possible to use the model in the practical work of large staffs, taking into account the values for the surprise factor derived from the experience of wars.

11499
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SOVIET COMMENTS ON NATO TRAINING EXERCISE 'SAINT GEORGE'

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 7, Jul 81 (signed to press 8 Jul 81) pp 27-30

[Article by Maj Gen N. Ivlev: "The 'Saint George' Exercise"]

[Text] The purposeful peace-loving policy of the Soviet Union and the other socialist commonwealth nations, which consists mainly in struggling to reduce the danger of war and restrain the arms race, has met with open hostility on the part of the chief imperialist states. This applies primarily to the USA, which is attempting to place the vital interests of mankind on the line for the sake of its narrow mercenary goals. Whipping up anti-Soviet hysteria, imperialist circles of nations in the aggressive NATO bloc are exacerbating international tensions and stepping up their preparations for war. This is clearly confirmed by the ever-increasing scale of exercises and maneuvers conducted in Western Europe in the immediate proximity of the borders of socialist states. The commands and staffs of the NATO Combined Armed Forces and a considerable part of their formations and units (more than 300,000 men) took part in the "Autumn Forge" maneuvers conducted by the NATO Combined Armed Forces in the fall of 1980, for example, and around 20,000, armored personnel carriers and wheeled vehicles, as many as 2,000 aircraft and around 500 ships were used. According to the Western press those maneuvers included a bilateral exercise named "Saint George" and involving the FRG's 3rd Army Corps (with participation by U.S. and French forces), which took place between 15 and 22 September 1980 in the central part of the FRG (the states of Hessen and Bavaria).

The 2nd Infantry Division, the 12th Tank Division, corps units of the 3rd Army Corps, the 26th Airborne Brigade of the 2nd Army Corps's 1st Airborne Division of the FRG and the 3rd brigade of the U.S. 5th Army Corps's 8th Mechanized Division, the corps being deployed in the FRG,actually took part in the exercise. Air support was provided by six West German air squadrons, four American squadrons and one French air squadron. A total of around 50,000 men (including more than 4,000 American servicemen and 5,000 West German reservists) took part in the exercise, and around 17,000 tracked and wheeled vehicles and up to 450 planes and helicopters were used. The exercise was directed by Lieutenant General Kleffel, commander of the FRG's 3rd Army Corps, and his staff. The combat operations were observed by FRG Chancellor H. Schmidt, the higher military leadership of the Bundeswehr and NATO and representatives of other nations in the bloc.

As announced by the West German command the main objective of the exercise was to test (following the reorganization of the ground forces) the combat capabilities of

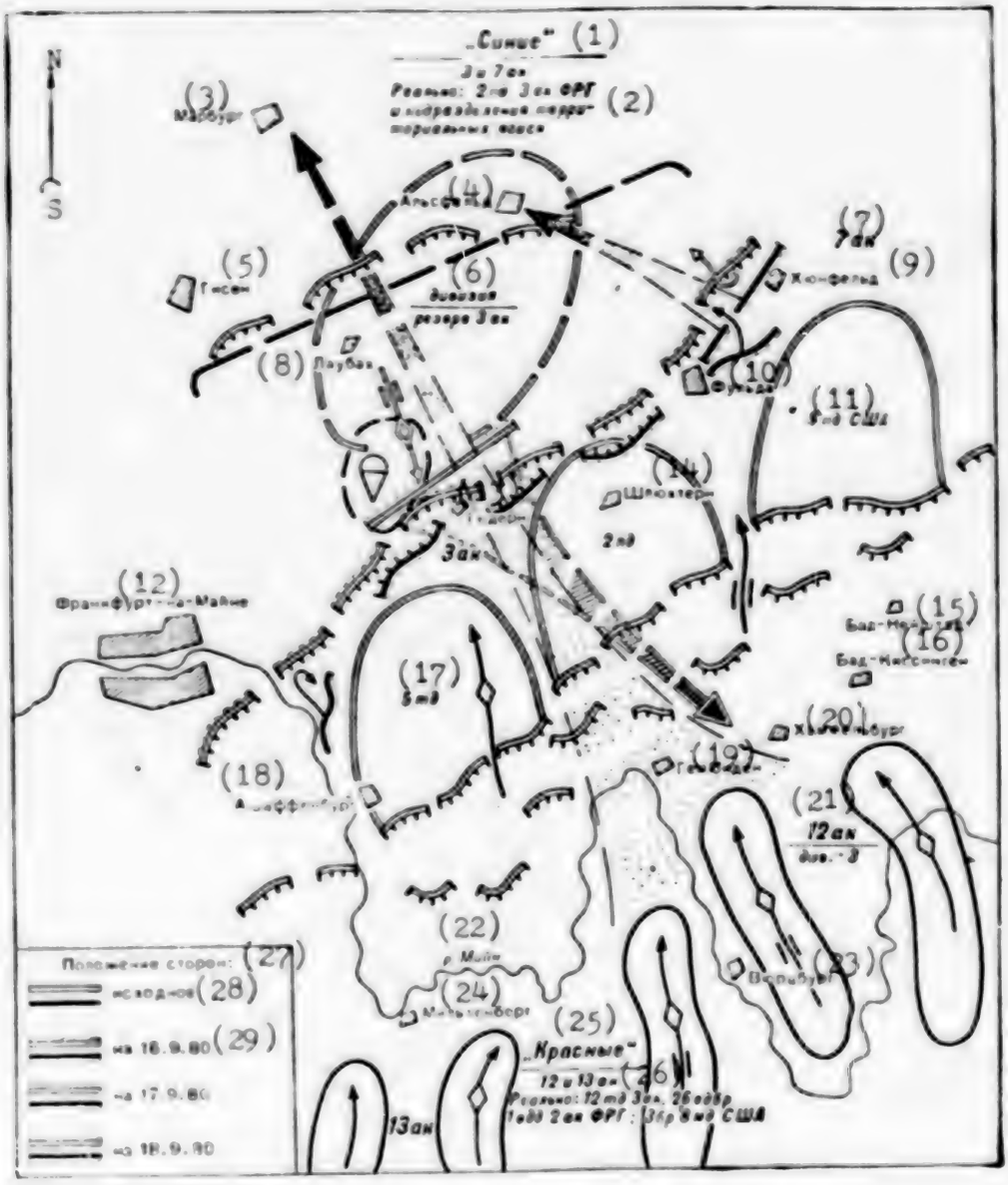
the 3rd Army Corps in coordination with allied forces in operations of the initial period of a war in the Central European TVD[Theater of Military Operations]. The exercise was bilateral, which gave the forces experience in combatting an "enemy" in both an offensive and a defense. According to the foreign military press it covered the following: the complete mobilization of reservists (actually the 16th Heimatschutz Command); the testing of combat readiness of corps units and formations when converted from peacetime to war footing; bringing the units to up war TOE strength and their movement to areas of operational designation; the organization and conduct of offensive, defensive and delaying operations; switching from one type of combat operations to another in a rapidly changing situation, the organization of interaction between ground forces and tactical aviation and between staffs and units of various nations; the testing of new types of weapons (the WO 105R antitank helicopter and the Gepard 35mm twin self-propelled antiaircraft artillery mount); material and technical troop support; the organization of stable control in various control in various types of combat.

One side in the exercise--forces of the "Northern Alliance"--were called the "Blues," and the other side--the "Southern Alliance"--the "Reds." The hypothetical state border between the "alliances" passed along a line between Bad Neustadt, Rhein river, Miltenberg. The FRG's 3rd Army Corp (actually its 2nd Infantry Division) hypothetically fought on the side of the "Blues." Its battle order was in two echelons, with two divisions in the first echelon and one in the second. The 12th and 13th Army Corps, with three divisions each, hypothetically fought on the side of the "Reds" (actually the FRG's 3rd Army Corps's 12th Tank Division and the 26th Airborne Brigade of its 2nd Army Corps's 1st Airborne Division, and the 3rd Brigade of the U.S. 5th Army Corps's 8th Mechanized Division).

The basic concept of the "Saint George" exercise (see diagram), like those of most other exercises previously conducted by the combined and the national armed forces of the NATO nations was based on a stereotyped situation, in accordance with which relations between the "allies" became greatly aggravated at the beginning of September. The "Reds" began concentrating large groupings of forces in the border areas under the guise of conducting exercises. Concluding that the "Reds might launch a war, the "Blue" command began to carry out mobilization measures and by 15 September had advanced troops into areas designated for operations.

According to the plan the "Reds" would violate the state border on the morning of 15 September and, following air strikes, their tank groupings would switch to an offensive, concentrating their main efforts on the Gemunden and Marburg sector. They would defeat the defending divisions in the first echelon of "Blues," occupy the area between Fulda and Gedern and take steps to further develop the offensive. The "Blues" would halt the offensive with restraining actions by covering forces and with a determined defense, move up reserves (second echelons), carry out a counterattack against penetrating "enemy" forces and drive them back to their initial position.

The active phase of the exercise was preceded by a lengthy preparatory period, during which the units and subunits were involved in tactical and special exercises and the officers performed headquarters exercises. The communications subunits were taken into the field (near the sites of their permanent deployment), where they practiced setting up the communications equipment, received and transmitted training information. Extensive drills were conducted with the engineer units, repair and reconstruction battalions, army aviation subunits, transport and medical battalions.



Plan and Development of Exercise

Key:

1. "Blues"
2. 3d and 7th Army Corps (actually the 2d Infantry Division of the FRG's 3d Army Corps)
3. Marburg
4. Alsfeld
5. Giessen
6. Division/reserve, 3d Army Corps
7. 7th Army Corps
8. Laubach
9. Huhnfeld
10. Fulda
11. U.S. 9th Infantry Division
12. Frankfurt am Main
13. Gedern
14. Schluchtern
15. Bad Neustadt
16. Bad Kissigen
17. 5th Tank Division
18. Aschaffenburg
19. Gemunden
20. Hammelburg
21. 12th Army Corps (3 divisions)
22. Main River

[Key continued on following page]

Key:

23. Wurzburg
24. Miltenberg
25. "Reds"
26. 12th and 13th Army Corps (actually the 12th Tank Division of the 3rd Army Corps, the 26th Airborne Brigade of the 1st Airborne Division of the FRG's 2d Army Corps and the 3d Brigade of the U.S. 8th Mechanized Division)
27. Positions of sides
28. Initial
29. On

The Western press points out that a great deal of attention was devoted to the preparation of the team of umpires, which were taken from the 5th Tank Division of the FRG's 3d Army Corps and the 10th Tank Division of its 2d Army Corps and from the staff of the U.S. ground forces in Europe. A total of more than 500 officers and NCOs were used as umpires. They underwent special brief training courses, which consisted of theoretical classes and practical training as umpires in various situations.

The troops were moved to the forming-up areas between 8 and 14 September. The wheeled equipment travelled under its own power, while the tank subunits, heavy engineer battalions (the 310th and 320th), the 2d Composite Artillery Regiment and other units were hauled in by rail. The West German press underscored the fact that the traffic-control subunits took effective steps to assure that the advancing forces caused as little damage as possible to the farms (the amount still reached 50 million Marks, however).

The active phase of the "Saint George" exercise was in four stages. During the first stage (15-16 September) the "Reds" worked on marching, joining a battle from the march, repelling an "enemy" offensive and conducting a counterstrike. In the second phase (16-17 September) the "Blues" worked on offensive operations, while the "Reds" practiced delaying and defensive actions. In the third phase (17-18 September) the "Reds" prepared for a switch to a counteroffensive, while the "Blues" set up a solid defense. On 18 September the "Reds" carried out a counterstrike against the flank from the Huhnfeld-Fulda line, as a result of which the "Blues" were forced to hastily move up their reserves and organize the repelling of the counterstrike on the flank to prevent the "enemy" from reaching their rear area. In the concluding phase (18-20 September) the troops returned to their permanent deployment areas and performed specific individual tasks. According to the foreign press the combat operations took place in a rapidly changing situation and were highly dynamic. West German military experts assessed them as taking place in accordance with the "forward defense" concept, whereby the basic defeat is inflicted upon the enemy in the conduct of combat for the forward defensive line.

The Western press reports that the defense zone of the army corps in the exercise was around 70 kilometers wide and approximately 95 kilometers in depth. A security zone up to 25 kilometers deep was created in front of its forward defensive edge, to which covering forces were assigned. In the offensive the corps operated in two echelons in a 50-60 kilometer zone, with divisions in the first echelon assigned a 20-25 kilometer area and the brigades a 12 kilometer area.

A great deal of attention was devoted to the operations of tactical airborne landing groups and to the skilfull use of antitank means. Ground and helicopter-borne

antitank guided missile launchers, A-10 aircraft and minefields were extensively employed for this purpose. As many as 60-70 aircraft sorties per day were carried out to provide direct support for the ground forces of divisions in the first echelon.

The Bundeswehr command rated the exercise as generally successful. Lieutenant General Koppel, inspector of ground forces for the Bundeswehr, stated that it confirmed the effectiveness of the "forward defense" concept. Summing up the exercise, the foreign press stated that, in addition to the performance of strictly military missions, "Saint George" had the objective of demonstrating the FRG's readiness to its NATO partners and of contributing to the further strengthening of "Atlantic solidarity" by further increasing the combat strength of the West German formations and improving their offensive capabilities.

11499
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SOVIET COMMENTS ON USAF RADIOELECTRONIC WARFARE MATERIEL

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 7, Jul 81 (signed to press 8 Jul 81) pp 43-47

[Article by Eng-Col V. Lunyakin, candidate of technical sciences, docent: "The Use of Airborne Radioelectronic Equipment in the U.S. Air Force"]

[Text] The militaristic preparations in the U.S. Air Force command places special emphasis upon the use of the latest radioelectronic warfare (REB) equipment. This is necessitated, in the opinion of Americal military experts, by the fact that in today's situation the systems of control of air forces, ground forces, air defense forces and facilities include a considerable quantity of radioelectronic equipment (RES), the suppression of which would make it impossible for the enemy to react promptly and correctly to changes in the situation and from the standpoint of supporting air force combat operations, would contribute to the successful penetration of air defense facilities and improve the effectiveness of air strikes against the assigned targets.

Judging from articles in the foreign press the U.S. Air Force has greater radioelectronic warfare capabilities than do the other branches of the armed forces, since they are better equipped and more mobile. Among other things, the American combat aircraft carry reconnaissance equipment, radioelectronic suppression sets and devices for releasing anti-radioelectronic reflectors and infrared decoys, as well as powerful on-board weapons for suppressing enemy radar stations.

The American experts, however, believe that the effective use of radioelectronic warfare equipment possessed by the Air Force depends greatly upon how it is organized. In this article we shall use information published in the foreign press for discussing the organization of the combat employment of airborne radioelectronic warfare equipment in the U.S. Air Force, mainly to provide support for tactical aircraft for penetrating the enemy's air defense system.

According to the views of American experts the airborne radioelectronic warfare equipment should always be used in accordance with a carefully compiled plan, which takes into account preliminary reconnaissance data on the objects to be suppressed.

The enemy's radioelectronic reconnaissance is broken down into radiotechnical and radio reconnaissance, the former being considered the most important for the U.S. Air Force. It is in turn devided into preliminary and final reconnaissance and is conducted by specially equipped, manned and unmanned aircraft and by means of land- and ship-based facilities, as well as from outer space.

Preliminary radiotechnical reconnaissance is conducted for purposes of determining the coordinates of the enemy's radioelectronic facilities, their characteristics and condition, the methods used for controlling and guiding the air defense means and steps taken to combat interference.

The type of radioelectronic station is determined from the intercepted signal (working frequency, pulse repetition rate and duration, scanning mode and field). The positions for switching on the airborne radioelectronic warfare equipment, their areas of employment and operating modes for the different flight phases are defined and the specific missions involved in suppressing the enemy's ground radioelectronic facilities are assigned to the aircraft crews in accordance with the radioelectronic situation which is revealed.

The foreign press reports that in order to achieve more precise organization of radioelectronic warfare, graphic and descriptive models of the enemy's air defense system are compiled for each flight route of the strike groups or for the zone of combat operations as a whole.

The graphic model shows the positions of radar posts (RLP) and control posts (PU) from which interceptors can be guided; the borders of the detection zones and the calculated interception lines; the positions of medium- and long-range antiaircraft missile systems and the borders of their destructive zones; and sectors of the flight routes in which the aircraft can be expected to be fired upon by short-range antiaircraft missile systems or antiaircraft artillery.

The descriptive model (ordinarily compiled in the form of a table) is a supplement to the graphic model and consists of a list of the main characteristics and operating features of the enemy's radioelectronic system (for each radioelectronic post, each control point, each type of antiaircraft missile complex, each antiaircraft artillery system and the system carried by the interceptor), which influence the selection of means of radioelectronic suppression or destruction by fire. It indicates the type of emissions (pulse or continuous), the pattern for changing the working frequency (tuning range and retuning rate), scanning modes (circular or sector scan on a horizontal plane, broad or narrow scanning beam on a vertical plane), methods used for tracking targets based on angular coordinates (open or closed conical scanning, multipulse) and so forth. The pulse repetition rate and the mode for changing it are also considered important characteristics.

In the opinion of the American experts this detailed model of the radioelectronic situation simplifies the job of analyzing the enemy's air defense system and provides for optimal use of personnel and equipment on various sectors of the flight route to and from the target. It is used for distributing the radioelectronic warfare means of group protection for creating interference from defensive patrol zones over territory occupied by one's own troops and from the combat formations of the attack forces, and for programming the operation of radioelectronic warfare means of individual protection installed on practically all of the assault aircraft.

The radioelectronic situation is then defined more precisely from information provided by the final radiotechnical reconnaissance, which is carried immediately prior to take-off by the assault aircraft and during their flight to the combat assignment. Its main mission is that of revealing previously undetected sources of emissions and determining their characteristics, assessing the degree of danger posed by them and

redistributing the effort (when necessary) involved in conducting radioelectronic warfare.

If the radioelectronic warfare means of group protection are to be used mainly for combatting early warning radar stations, controlling interceptors and designating targets, the individual protection is used for suppressing guidance stations for antiaircraft missiles and artillery.

The generation of interference from the zones is designated for preventing the enemy from detecting the axis of the main air strike and from determining the composition of the groups of aircraft attacking from various directions. The flight altitudes for the radioelectronic warfare aircraft in the zones and while they are generating interference must be coordinated with the operations of the attack groups in order to achieve the most effective suppression of the enemy's radioelectronic system to the assigned depth and for the required period of time.

The radioelectronic warfare systems of such aircraft as the EA-6B, for example, can be controlled in the zones automatically by means of on-board electronic computers, semiautomatically or manually, with operator participation. In the automatic mode the entire control cycle--the search in designated frequency ranges, determination of the type of emission sources detected, distribution of the interference capacities over the frequency ranges by designating the number of transmitters and the spectrum for their emissions, and control of the directional antennas--are performed by an on-board electronic computer. In the semi-automatic mode the operators are charged with finding targets on the frequency of the transmitters, the remaining suppression tasks being performed by an electronic computer. In the manual mode all of the control functions are performed by the operator.

Planning and the employment of radioelectronic warfare personnel and equipment from the combat formations of the assault groups have their own peculiarities, which are predetermined both by the nature of the tasks they perform and by the methods for using the equipment on a flight. When the tactical aircraft are to strike targets located in the depth of the enemy's battle orders, that is, when they have to overcome the enemy's air defense system, the on-board radioelectronic warfare equipment is used and the strike groups are supported by special interference generating aircraft--among others, the EF-111 and F-4G "Wild Weasel" aircraft (the latter are designated for destroying the most important ground radar stations with their fire). The diagram shows one of the patterns for conducting a strike against a target located in the tactical depth of the enemy's battle orders, with the support of interference generating aircraft. In this case, prior to the attack, the radioelectronic warfare aircraft take up a position in patrol zones beyond range of the enemy's air defense facilities and begin creating advance interference at a prescribed time.

The assault group and aircraft designated for suppressing and destroying ground air defense facilities take off a short time after interference begins to be created from the zones and fly to the target at low altitude, taking advantage of means of concealment provided by the terrain. When it has been determined that the aircraft have been locked onto for automatic tracking by the antiaircraft missile and antiaircraft artillery fire control radar stations, they switch on their interference generating systems in accordance with a program worked out in advance and refined on the flight. In

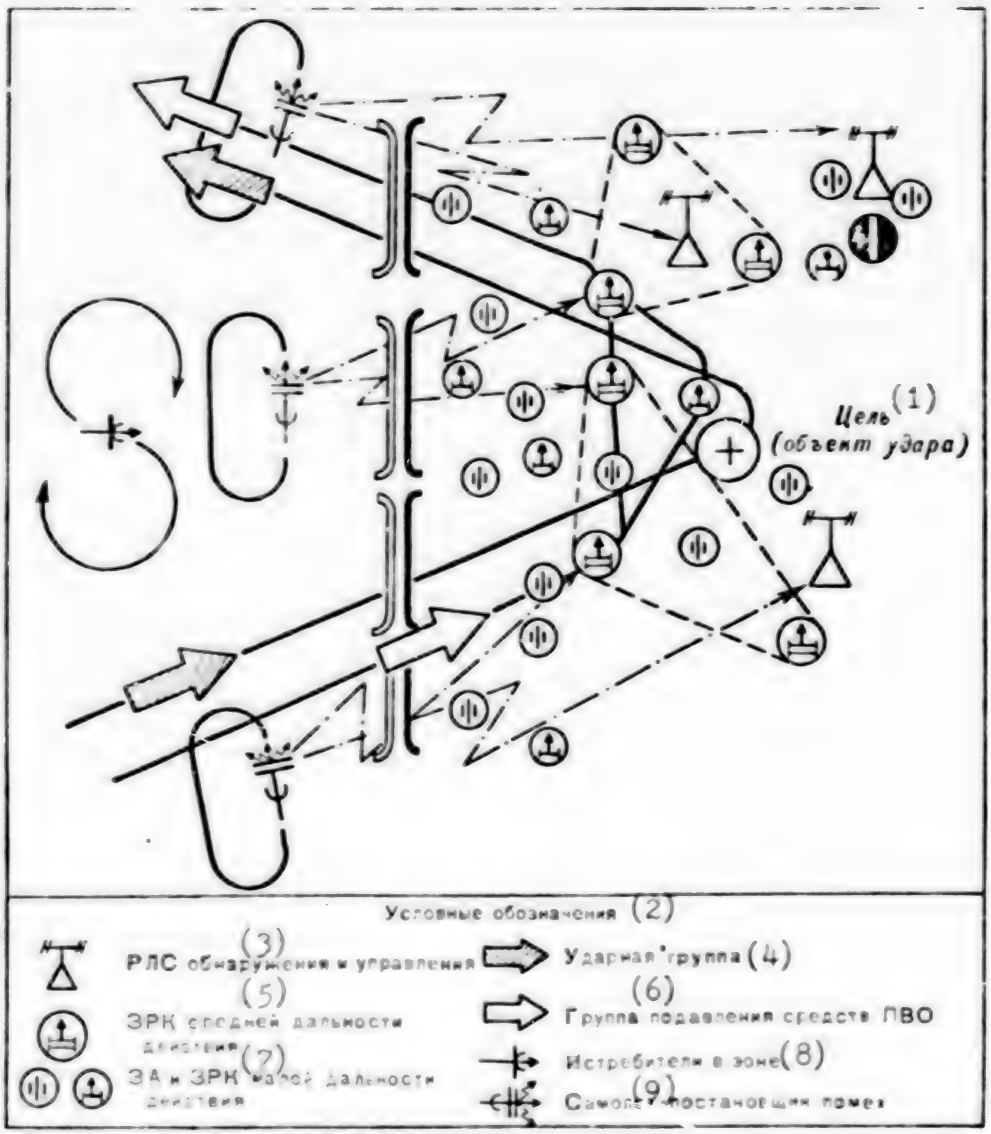

Diagram Showing the Organization of a Strike Against a Target Located in the Tactical Depth of the Enemy's Battle Orders, With the Support of Interference Generating Aircraft (a version)

Key:

1. Target (object of the strike)
2. Legend
3. Warning and control radar
4. Assault group
5. Medium-range antiaircraft missile complex
6. Air defense means suppression group
7. Short-range antiaircraft artillery and antiaircraft missile complex
8. Fighters in the zone
9. Interference generating aircraft

addition, when there is a danger that air defense means will be employed, the crews of the tactical fighters take various actions to avoid enemy fighters and antiaircraft fire and periodically release dipole reflectors.

Just as they approach the target the assault aircraft take on altitude to improve their field of view and to deliver an accurate strike, and once again release dipole reflectors and infrared decoys as protection against antiaircraft missiles.

Summing up their experience with local wars, tests and exercises, the American experts have concluded that it is expedient in certain tactical situations to use the on-board radioelectronic warfare equipment of assault aircraft (the A-10 assault aircraft, for example), when the latter are striking at forward units of advancing enemy troops at minimum altitudes. It is believed that in this case, operating from altitudes on the order of 30 meters, the aircraft will be detected by the enemy's antiaircraft missile and antiaircraft artillery systems, but by taking advantage of their good maneuverability, will succeed in carrying out the strike, turning around and departing the range of self-propelled antiaircraft weapons covering the armored troops, while the antiaircraft missile systems will be unable to fire upon them due to the fact that they are located a certain distance from the forward advancing units and will therefore not detect the attacking aircraft until it is too late.

American experts feel that there are many variations for radioelectronic warfare against enemy air defense means by tactical fighters, but that the basic rules remain relatively constant: operating under cover of active interference from group defense radioelectronic warfare aircraft; disruption of automatic radar tracking by generating active (simulating and camouflaging) and passive interference by means of radioelectronic warfare means of individual protection; maneuvering when within striking range of air defense facilities.

Attaching great importance to the conduct of radioelectronic warfare, the U.S. Air Force command devotes special attention to the development of radioelectronic means and the training of air units and subunits for combat operations using those means. The study of enemy radioelectronic systems and the use of all available means and methods of combatting them occupy an important place in the combat training of American military pilots. Methods of overcoming enemy air defense systems in a situation of active radioelectronic warfare are practiced for this purpose in many air units. And the U.S. military press openly calls the Soviet Union and other nations of the socialist commonwealth the "enemy."

Among other things, the American magazine AVIATION WEEK AND SPACE TECHNOLOGY reports that devices have been deployed at a special air training ground near Nellis Air Force Base in the state of Nevada, which simulate the functioning of the basic radiotechnical equipment of Soviet antiaircraft missile systems and fighter-interceptor guidance systems. There were more than 100 such simulators at the training ground in 1980, with a density of 30-40 per 10 square kilometers. In the opinion of the American experts this corresponds to the average density of air defense radioelectronic systems in Eastern Europe.

At this same training ground, which is actually a center for testing weapons and for working out the actions of tactical fighters under conditions made to resemble actual combat to the maximum possible degree, the aircraft crews practice in Red Flag exercises tactics for penetrating the air defenses of the Warsaw Pact nations, with the extensive employment of on-board radioelectronic warfare weapons. The foreign press states that in these exercises the operation of the training ground's radioelectronic means is ostensibly performed according to the rules governing the performance of Soviet operators,

while the interception of air targets and control of the air defense forces and facilities are carried out according to methods used in the Soviet Armed Forces. During the flights interference is produced for the radio stations communicating with them.

American pilots who took part in combat operations in Vietnam and the Near East feel that the situation in the exercises adequately simulates a combat situation. The new pilots claim that the flights in this situation enable them to better learn the procedure for employing radioelectronic warfare weapons and to work out evasive actions for use against antiaircraft weapons and fighters.

The simulators installed at the training ground are used for testing new means and methods of radioelectronic warfare for the tactical aviation of the U.S. Air Force and Navy. Specifically, the combat capabilities of a new aircraft--the EF-111A interference generator--were tested and rated there. All of its equipment, which was developed on the basis of the EA-6B aircraft's AN/ALQ-99 container-type interference station, is located within the fuselage. This made it possible to preserve the aircraft's good tactical flight characteristics, as a result of which it can travel within the actual combat formations of the assault group and cover it with interference.

11499
CSO: 1801/088

PERCEPTIONS, VIEWS, COMMENTS

SOVIET COMMENTS ON ENGLISH TANKER AIRCRAFT

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 7, Jul 81 (signed to press 8 Jul 81) pp 48-50

[Article by Engr Col P. Ivanov: "Tanker Aircraft in Great Britain's Air Force"]

[Excerpts] British experts regard the aerial refueling of combat aircraft as one of the main means of increasing their combat capabilities. They believe that aerial refuelings will considerably enlarge the range and the payload of combat aircraft, increase the mobility of air units and subunits and reduce the amount of time required to move them to distant theaters of military operations and deploy them there.

The foreign press reports that for the performance of this task the British Air Force has two combat squadrons (the 55th and 57th) and one combat training squadron (the 231st) of Victor-K.2 refueling aircraft (the foreign press frequently refers to them as tankers) (a total of 24 aircraft--Figure 1 [photographs not reproduced]). They are all a part of the 1st Bomber Group and are based at (Marem) Air Station.

In addition to deploying yet another refueling squadron, as reported by the American magazine AVIATION WEEK AND SPACE TECHNOLOGY, Great Britain's military leadership plans to modify some of the aircraft of civil aviation companies to make it possible, should the need arise, to rapidly install refueling containers (assemblies) on them, thereby converting them into refueling aircraft. For purposes of training crews for these aircraft it is planned to form a group of pilots and set up special courses and practical training to teach them the techniques of performing aerial refuelings.

The increased attention being given to expanding the tanker fleet by Great Britain's Air Force command fully conforms to the military-political course pursued by the nation's current leadership, which, together with the United States, its senior partner in the aggressive NATO bloc, is actively preparing to implement global aggressive plans in areas of the world located considerable distances from England itself.

11499
CSO: 1801/088

SOVIET COMMENTS ON AERIAL CAMERAS OF NATO COUNTRIES

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 7, Jul 81 (signed to press 8 Jul 81) pp 50-57

[Article by Eng-Lt Col S. Alekseyev: "Aerial Cameras of Foreign Countries"]

[Excerpts] The development of aerial reconnaissance, including aerial photography, is assigned an important role in the overall system of military preparations by the imperialist states. One of the most commonly used methods of acquiring information on the enemy, aerial photographic reconnaissance, according to Western military experts, is superior to all other methods of aerial reconnaissance with respect to reliability, volume and quality of information. Photographic equipment is also extensively used for fixing images obtained by means of other reconnaissance equipment (radar, television or infrared). As shortcomings of aerial photography the foreign experts list the fact that the quality of a picture depends upon meteorological conditions and the state of the atmosphere, the difficulty of detecting camouflaged objects, the lengthy process involved in delivering, processing and interpreting the photographs, and the need to artificially illuminate the terrain when photographing at night.

Judging from reports in the foreign press, the United States and other NATO nations presently have more than 100 types of aerial cameras (AFA) for various purposes, which are designed to perform an extremely broad range of reconnaissance missions, both during a war and in time of peace. The characteristics of the main types of aerial cameras of foreign countries, compiled from materials published in the foreign press, are presented in the table [graphics not reproduced].

The foreign press reports that the United States has introduced a standardized system for designating aerial cameras, in accordance with which the following letter designators are used: K for camera; A--reconnaissance; B--monitoring combat operations (bombing, aerial firing and so forth); C--cartography; D--the registering of images from radar screens; E--aerial still cameras (backing the capability of compensating for the shifting of the image); F--motion-picture filming; M--all-purpose aerial cameras; G--special-purpose aerial cameras; S--aerial cameras adapted for use as part of a self-contained system of

photographic equipment. The letter F with a three-digit number followed by a certain letter (F-924, for example) indicates the trademark, which, following the adoption for use of the given aerial camera, is replaced by one of the above designations adopted for use in the armed forces.

The airborne equipment of reconnaissance aircraft may include from 3 to 12 aerial cameras, in order to obtain the maximum amount of reconnaissance data for each flight and to make it possible to conduct photographic reconnaissance at any flight altitude during the day or night. Their arrangement on the aircraft makes it possible to photograph on any scale, from various angles (vertical or oblique, from the right or left, forward or backward), with longitudinal or lateral coverage. For example, one set-up of reconnaissance equipment for the American RF-4C reconnaissance aircraft includes the following: one KS-87B aerial camera for taking oblique pictures in front of the aircraft along the line of flight (Figure 3) and the KA-55A and KA-56A for panoramic filming from high and low altitudes respectively. The aircraft tail section has a compartment with photographic cartridges to make night photography possible. It has been calculated that during a single flight at an altitude of 7,000 meters and RF-4C can photograph an area 50-70 kilometers wide and 800-1000 kilometers long with 50 percent longitudinal coverage.

So-called camera mounts are used to secure the aerial cameras on the aircraft and to protect them against vibrations and shocks. Aerial cameras are vertical, oblique or vertical-oblique, depending upon the direction of their optical axis in space. The camera mounts make it possible to position the optical axis of the cameras as required for vertical or oblique filming. It is the opinion of Western experts that tilting aerial camera mounts can increase the area photographed during a single flight and can provide double-, triple- or quadri-traverse filming. Suspended pods for reconnaissance equipment, including aerial cameras, have been developed abroad in recent years to make it possible to use not just special reconnaissance aircraft but other aircraft as well (mainly tactical fighters) for purposes of conducting reconnaissance. Automatic 35-mm cameras are ordinarily installed in the pods. Two long-focus aerial cameras, the KA-102A (focal length 1,670 millimeters) and the KA-112A (1,829 millimeter, Figure 4 [graphics not reproduced]), as an example, were created in the United States for use in such pods. According to American experts, they make it possible to conduct daytime photographic reconnaissance in flights along state borders to a depth of up to 110 kilometers without the reconnaissance aircraft entering the airspace of the country being reconnoitered.

More than 20 types of photographic materials are used for aerial photography. They differ from each other in their properties (spectral or general photosensitivity) and graphic qualities (color, discrimination, graininess). Judging from the foreign press, panchromatic film is most frequently used, the spectral sensitivity of which covers the entire visible range of the spectrum. Three-ply negatives and reversible film with a discriminating capacity of 70-100 lines/millimeter is used for filming in color. Infrachromatic film, the spectral sensitivity of which embraces the 0.4-0.9 micron waveband, is used for filming in the near infrared region of the spectrum and for high altitudes in extensive haze.

According to the Western press, aerial photographic equipment is currently undergoing intensive improvement in the main NATO nations. Among other things, all-purpose cameras are being developed, which are suitable for filming from both high and low altitudes, a study is being made of the possibility of creating aerial cameras of modular design (in which case it would be possible to assemble various types of aerial cameras at airfields out of separate modular units), and for the future it is planned to switch to electronic cameras, in which solid-state matrix photographic receivers will be used instead of film. Foreign military experts believe that these and other steps will make it possible to expand the possibilities of aerial photographic equipment and of aerial reconnaissance in general.

11499
CSO: 1801/088

PERCEPTIONS, VIEWS, COMMENTS

SOVIET COMMENTS ON NEW U.S. AIR-TO-AIR MISSILE

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 7, Jul 81 (signed to press 8 Jul 81) pp 57-58

[Article by Eng-Lt Col V. Valentinov: "A New 'Air-to-Air' Guided Missile"]

[Excerpts] Using as its cover the notorious myth about a "Soviet military threat," the Pentagon is building up its effort to create the most modern of weapons, including aviation weapons. At the present time, according to reports in the foreign press, the United States is engaged in the development of a new medium-range, air-to-air guided missile (UR), the AMRAAM, which, according to the plan of its creators, is to replace the present Sparrow guided missile.

The program for development of the missile is now in the stage of approval and testing of the technical plans for development of the missile's main components (guidance system, engine unit, warhead and fuse). The Raytheon (Reyteon) and Hughes Aircraft companies are participating on a competitive basis at this stage. According to the terms of their contracts they are to produce 16 experimental models each for conducting various tests, including bench tests, as well as practice launchings with programmed flights and guidance to guided airborne targets. It is planned to complete this phase in November of 1981, when one of the contractors will be selected to continue the development of the missile.

The foreign press notes that it is planned to begin series production of the AMRAAM guided missile in 1984. The military experts estimate the cost of one missile at $80,000.00, and a total of 20,000 missiles are to be produced.

11499
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SOVIET COMMENTS ON U.S. NAVAL CAPABILITIES

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 7, Jul 81 (signed to press 8 Jul 81) pp 59-64

[Article by Capt 1st Rank (Res) R. Dmitriyev: "Prospects for Development of the U.S. Navy's Fleet of Ships"]

[Text] Vigorously encouraging the provocational fuss about the mythical "Soviet military threat," leading circles in the United States are forcing a buildup of combat strength for the Navy, which is designated, in cooperation with the other services and branches of armed forces, for assuring the achievement of American imperialism's aggressive goals and in peacetime, of exerting military-political pressure upon foreign states by "showing its flag" along their posts.

The United States is currently manifesting its most expansionistic aims in Southwest Asia where there are enormous oil reserves providing the American monopolies with multibillion dollars in profits and where the peoples' struggle for national liberation is spreading. The Pentagon has concentrated in the waters of the Indian Ocean and the Persian Gulf a naval grouping (more than 30 ships) unprecedented in those areas and plans to leave it there permanently. Furthermore, judging from statements by officials of the Reagan Administration, the American leadership plans to extend its military presence to other regions as well (to practically all areas of the world). In connection with this the Pentagon plans to considerably increase the fleet of ships of the U.S. Navy.

In this article, written on the basis of materials published in the Western press, the author discusses the numerical strength and prospects for development of the U.S. Navy's fleet.

According to reports in the foreign press the American fleet numbered more than 420 combat ships at the beginning of 1981, including 39 nuclear ballistic missile submarines (PLARB),[1] 75 nuclear torpedo submarines (PLA) and 5 diesel-powered submarines, 13 aircraft carriers (including 3 nuclear-powered carriers),

1. According to the latest reports in the Western press, two "George Washington" class ballistic submarines have been dismantled and removed from the combat fleet--Editor.

27 guided-missile cruisers (9 of them nuclear-powered), 37 guided-missile destroyers, 63 destroyers (including 20 ships of the special reserve), 74 frigates (including 15 guided-missile ships), 63 landing ships and 25 minesweepers (22 in the special reserve). In addition, there were around 110 auxiliary vessels and more than 70 naval transport vessels.

It is stated that at that time 75 ships and boats had been ordered or were in various stages of construction: 8 "Ohio" class ballistic missile submarines, 22 "Los Angeles" nuclear submarines, 2 "Chester W. Nimitz" aircraft carriers, 2 "Ticonderoga" guided missile cruisers, 4 "Kidd" guided missile destroyers, the "Spruance" class DD997 destroyer, 31 "Oliver H. Perry" class guided missile frigates, 5 "Pegasus" class missile-carrying hydrofoils and around 10 auxiliary vessels.

Under a five-year ship-building program it is planned to finance the construction of 113 ships and auxiliary vessels in the period 1982-86, including 6 "Ohio" class ballistic missile submarines, 7 "Los Angeles" class nuclear-powered submarines and 1 nuclear-powered submarine of a new design, 1 nuclear-powered aircraft carrier, 17 "Ticonderoga" class guided missile cruisers, a DDGX class guided missile destroyer, 5 "Oliver H. Perry" class guided missile frigates and 6 FFX class frigates, 1 landing ship, 13 minesweepers, 10 long-range sonar surveillance vessels, 13 vessels to serve as floating heavy weapons and combat equipment depots and other auxiliary vessels. This program calls for modernizing a number of ships in service and for taking one conventionally powered aircraft carrier and two battleships out of the reserve.

According to the American press the U.S. Navy Department plans to increase the number of combat ships in the fleet to 600 in the future.

Nuclear-Powered Missile Submarines

The foreign press reports that at the beginning of 1981 the United States had 39 ballistic missile submarines. They included 6 converted "Lafayette" class submarines armed with Trident 1 ballistic missiles (instead of the planned 7), 25 "Lafayette" class submarines (Figure 1 [graphics not reproduced]) armed with Poseidon C-3 missiles, 3 "George Washington" class submarines armed with Polaris A-3 missiles and 5 "Ethan Allen" class submarines armed with Polaris A-3 missiles. These ballistic missile submarines form the backbone of the ocean-based nuclear missile system, which, in the opinion of Western military experts, best meets the demands made of the strategic forces today. The fact is stressed that it is at a high level of combat readiness, can be used effectively, has a high degree of concealment, little vulnerability and great firing accuracy. All of these qualities have contributed to the continued improvement of the system. This fact is confirmed by the trend constantly to increase the number of nuclear warheads on the ballistic missile submarines. According to the foreign press the figure reached 5,100 and comprised more than half the U.S.A.'s strategic arsenal in 1979. The importance of the naval component of the strategic offensive forces is becoming even greater with the creation in the 1980's

of the new Trident ocean-based nuclear missile system. It will be based on "Ohio" class nuclear missile submarines, which will initially be armed with 24 Trident I missiles with a firing range of around 8,000 kilometers and in the future, with Trident II missiles with a range of more than 11,000 kilometers.

Judging from materials in the foreign press, there are presently eight "Ohio" class ballistic missile submarines in various stages of construction in the United States for the Trident system. It was planned to place the prototype (SSBN726) into combat service in the middle of this year, but due to defects revealed in the submarine its transfer to the Navy is being held up. A second, the SSBN727 "Michigan" is being finished afloat. Of the remaining ballistic missile submarines under construction a third (SSBN728) and fourth (SSBN729) are to be launched in 1981. It was also planned to award orders for the construction of a ninth submarine in 1981. The total number of new submarines has not been determined, but foreign experts believe that it may go as high as 25-30 (600-720 launchers).

Trident I missiles had been installed on six "Lafayette" class ballistic missile submarines in the United States by the beginning of 1981. The foreign press notes that it is planned to rearm another six submarines by 1982. It is also reported that with the commissioning of the "Ohio" class submarines the ballistic missile submarines of the "George Washington" and "Ethan Allen" classes will be taken off the line. Some of them will be disarmed and mothballed, while others will be rearmed with Tomahawk winged missiles.

Nuclear-Powered Submarines

At the beginning of 1981, as stated above, the American Navy had 75 nuclear-powered submarines (37 "Sturgeon" class, 13 "Permit" class, 13 "Los Angeles" class, 5 "Skip Jack" class and 4 "Skate" class submarines, as well as 1 SSN685 "Glenard P. Lipscomb ," 1 SSN681 "Narwhal" class and 1 SSN597 "Tullibee".

The Navy Department is having a large series of "Los Angeles" type nuclear-powered torpedo submarines built (a total of 40) and plans to turn another 20 over to the Navy by 1985 and to increase the total number of nuclear-powered submarines in the regular Navy to 90. In addition, a five-year ship-building program (1982-1986) calls for completing the development of a new nuclear-powered torpedo submarine (FA-SSN) and financing the construction of a prototype. It is to have a smaller displacement (around 5,000 tons) than the "Los Angeles" class submarine (primarily to reduce construction costs), while retaining its combat capabilities. It is also planned to place "Tomahawk" winged missiles on the torpedo submarines. The implementation of these plans will significantly increase the overall number of nuclear warheads in the American Navy.

Diesel-Powered Submarines

Diesel-powered submarines form a small subclass. Only six of these were built in the 1950's (three of the "Barbell" class, as well as the SS576 "Darter," the SS574 "Grayback" and the SSAG567 "Gudgeon"). Submarines with conventional

power units are not being constructed. Recently, however, the American press has published more and more articles whose authors call upon the Pentagon to reconsider its attitude toward diesel-powered submarines. Those in favor of renewing their construction believe that they could find extensive combat employment for combating enemy submarines and surface ships in enclosed bodies of water and in coastal ocean waters, if they are deployed at forward bases in advance.

Aircraft Carriers

This class of ships is considered the nucleus of the general-purpose naval forces and a ready reserve of strategic offensive forces. Their role and importance are due primarily to their mobility, considerable self-sufficiency and broad range of combat capabilities. In the opinion of Western military experts they make up the only universal weapons system at sea capable of effectively operating at any spot on the World Ocean and of destroying air, surface and underwater targets, as well as coastal facilities, by employing conventional or nuclear weapons. This appraisal of the role of aircraft carriers is confirmed by their number and edition and by plans for their continued development. The regular U.S. Navy presently has 13 aircraft carriers: 3 nuclear-powered (the "Enterprise" and 2 of the "Chester W. Nimitz" class--Figure 2) and 10 with conventional power plants (4 of the "Kitty Hawk" class, 4 "Forrestal" class and 2 "Midway" class submarines). It is planned to turn over to the navy a fourth nuclear-powered aircraft carrier in 1982 (the CVN70 "Carl Vinson" of the "Chester W. Nimitz" class). Funds were allocated in 1980 for the construction of a fifth nuclear-powered aircraft carrier, the CVN71, with commissioning planned for 1988.

A program has been worked out in the U.S. Navy for the modernizing and increased overhauling of all aircraft carriers in turn (including the nuclear-powered carriers), with a view to extending their service life from 30 to 45-50 years. Under this program repairs which were to take 28 months were begun on the aircraft carrier CV60 "Saratoga" in 1980. Modernization will then be carried out on the CV59 "Forrestal" (1983-1985), the CV62 "Independence" (1985-1987), the CV61 "Ranger" (1987-1989) and so on. All aircraft carriers with conventional power plants will then be overhauled by the end of the 1990's.

The Western press reports that the Reagan Administration considers it essential to have at least 15 aircraft carriers in the Navy which will be deployed in various areas of the world arbitrarily declared by the United States to be within the sphere of its "vital interests." It is precisely for this purpose that the Navy plans to take the aircraft carrier CV34 "Oriskany" out of mothballs and place it into service in 1983. In addition, it is planned to expand the service of 2 "Midway" aircraft carriers to the beginning of the 1990's, and in order to retain 15 ships of this class in the Navy to the end of current century it is planned to build another 3 nuclear-powered aircraft carriers by the beginning of the 1990's.

Battleships

There are four ships of this class (BB61 "Iowa," BB62 "New Jersey," BB63 "Missouri" and BB64 "Wisconsin") in the American Navy's reserve. According to the foreign press the Pentagon plans to take two battleships (BB61 "Iowa" and BB62 "New Jersey") out of mothballs and, following their modernization, to send them to the Indian Ocean to beef up its naval grouping there. It is planned to arm these ships with "Tomahawk" tactical and strategic winged missiles (with firing ranges of 550 and 2600 kilometers respectively). Each battleship will carry 32 missiles. It is planned to place the ships into combat duty in the Navy in 1983 and 1984.

Cruisers

There are 27 guided missile cruisers in the regular Navy, 9 of which are nuclear-powered (4 "Virginia" class and 2 "California" class, as well as the CGN35 "Truxtun," the CGN25 "Bainbridge" and CGN9 "Long Beach") and 18 have conventional power plants (9 "Belknap" class and 9 "Leahy" class). Foreign experts note not only the merits of nuclear-powered guided missile cruisers (the use of nuclear power plants and the arming of the ships with modern VURO [antiaircraft guided missile weapons] systems and radioelectronic equipment), but also their shortcomings. The latter include high construction costs, complexity of design and so forth, which have affected plans for their construction. The previously planned construction of four CGN42 class nuclear-powered guided missile cruisers (based on the "Virginia" class nuclear-powered guided missile cruiser) has been cancelled, for example. According to the foreign press that plan has been replaced by a program for the construction of "Ticonderoga" class guided missile cruisers (28) designated primarily for the air defense of landing forces, detachments of combat ships and groups of vessels providing mobile rear support for ships at sea and for convoys.

It is planned to use in their construction the hulls and gas turbine units of "Spruance" class destroyers. Their armament will include two four-container launchers for "Harpoon" antiship guided missiles, two composite launchers for "Standard" antiaircraft guided missiles ("Aegis" antiaircraft missile systems) and ASROC antisubmarine guided missiles, each with two launching racks, two 127-mm and two 20-mm artillery guns, two triple-tube torpedo launchers for ASW torpedoes, and two helicopters of the "Lamps-Mk3" system. Two such ships were under construction in the United States in 1980. The prototype cruiser, the CG47 "Ticonderoga" guided missile cruiser, is to be launched during the first half of this year and placed into service in 1983. It is planned to finance the construction of 17 ships of this class during the period 1982-1986.

In the future it is planned to arm all nuclear- and conventionally-powered cruisers with "Tomahawk" winged missiles.

Destroyers

According to information published in the foreign press the U.S. Navy had 100 destroyers at the beginning of 1981: 37 guided missile ships (33 "Charles F. Adams" class, 10 "Coontz" class and 4 "Decatur" class ships) and 63 destroyers with artillery weapons[2] (30 "Spruance" class, 14 "Forrest Sherman" class, 17 "Gearing" class and 2 "Carpenter" class destroyers). The American Navy Department attaches great importance to this class of ships, the fact evidenced by construction plans published in the foreign press. Construction of the 31st "Spruance" destroyer--the last in the series--was begun in 1980. It is planned to turn the ship over to the Navy in 1983. In addition, the United States intends to begin construction of the next series of guided missile destroyers (DDGX class) in the mid-1980's. It is planned to allocate funds for construction of the prototype in 1985.

Along with the construction of new destroyers, those in service are being modernized. Destroyers of the "Spruance" and "Coontz" classes (the latter are guided missile ships), for example, are being outfitted with "Harpoon" antiship missiles (PKR). It is planned to install these antiship missiles and "Tomahawk" winged missiles on the "Kidd" class guided missile destroyers.

A report in the foreign press states that the U.S. Navy Department plans to take 12 destroyers out of the special reserve in 1981.

Frigates

Of the 74 ships of this class in the regular Navy, 15 are guided missile frigates (9 "Oliver H. Perry" class and 6 "Brooke" class frigates), and 59 carry artillery armament (46 "Knox" class, 10 "Garcia" class and 2 "Bronstein" class ships, as well as the FF1098 "Glover").

According to articles in the foreign press, the United States plans to complete the construction of a series of "Oliver H. Perry" class guided missile frigates (55) in the mid-1980's. It has also been reported that there were 31 frigates of this class under construction at the end of 1980 (8 of them are to be placed into service this year). Under the 1982-86 ship-building program it is planned to allocate funds for the construction of another five such ships, as well as six frigates of a new class for the special reserve.

Landing Ships

There are 63 landing ships in the regular Navy, including 2 staff ships ("Blue Ridge" class), 5 multi-purpose ships ("Tarawa" class, Figure 3), 7 helicopter carriers (vertoletonosets) ("Iwo Jima" class), 14 helicopter carriers (vertoletnyy korabl'-dok) (12 "Austin" class and 2 "Raleigh" class), 2 cargo transports ("Charleston" class), 13 landing ship-docks (transport-dok) (8 "Thomaston" class and 5 "Anchorage" class) and 20 LSTs ("Newport" class).

2. Twenty of these are ships of the special reserve (17 "Gearing" class, 2 "Carpenter" class and one "Forrest Sherman" class--DD946 "Edson").--Editor.

The five-year ship-building program covers financing for the construction of one LSD41 landing ship-dock, which will be turned over to the Navy in the mid-1980's. In the future these ships are to replace landing ship-docks of the "Thomaston" class. They will carry up to 400 fully equipped marines and helicopters or VTOL or STOL aircraft, as well as hovercraft.

Minesweepers

The U.S. Navy has 25 minesweepers, 22 of which are ships of the special reserve. RH-53D "Sea Stallion" helicopter-minesweepers (21) are extensively used for minesweeping work, and submarines and certain classes of surface ships, coastal patrol and deck-based aircraft and B52 strategic bombers are drawn upon for mine laying. According to the foreign press, it is planned to finance the construction of 9 minesweepers of a new class during the period 1982-1986 and to build another 15 within the next 10-15 years.

Auxiliary Vessels

Of the auxiliary vessels for the construction of which the United States plans to allocate funds under the 1982-86 ship-building program, Western militar[illegible]erts consider the most significant to be the T-AKX class of floating heavy weapons and combat equipment depots (13). They are designated for the advance delivery of weapons, materials and technical supplies for three expeditionary Marine brigades of the "Rapid Deployment Force" and will be based at "hot spots" on our planet. It is planned to complete the construction of these vessels by 1988.

The information we have presented on the construction of ships for the U.S. Navy and prospects for its development demonstrate once more the Pentagon's intent to expand the United States' presence in all areas of the globe and to prepare a Navy, as stressed in the newspaper WASHINGTON POST, to "conduct offensive operations against the Soviet Union." These aggressive designs of American imperialism demand that Soviet fighting men exercise constant vigilance and maintain a high level of combat readiness.

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PERCEPTIONS, VIEWS, COMMENTS

SOVIET COMMENTS ON NATO SONORADIOBUOYS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 7, Jul 81 (signed to press 8 Jul 81) pp 68-71

[Article by Capt (Res) G. Nikolayenko: "Aviation Sonoradiobuoys"]

[Text] The modern ASW aviation of the U.S. Navy and those of other nations in the aggressive NATO bloc are equipped with various means of searching for submarines: sonoradiobuoys (RGB), sonar sets, magnetic detectors, infrared sets, gas analyzers and other facilities.

Sonoradiobuoys are presently one of the main means of detecting submarines. They are used to determine a submarine's location (within an area of several square kilometers), after which the initial data are determined for employing a weapon, using other equipment (magnetic detectors, for example).

According to information published in the foreign press, there are passive and active sonoradiobuoys. Modern passive buoys make it possible to monitor sounds in the 10 hertz-to-20 kilohertz audio frequency range by means of hydrophones lowered from buoys on cables to shallow (18-27 meters), medium (91-137 meters) or great (305-457 meters) depths.

The depth to which the hydrophone is submerged is selected on the basis of optimal conditions for the dissemination of acoustic sounds in the given area of the sea, and the depth is set in advance on a buoy located on board a plane (or helicopter). These conditions are determined prior to ejecting the scanning sonoradiobuoys by means of special AN/SSQ-36 bathythermographic buoys, which measure the temperature, salinity and pressure of the water to a depth of 350 meters (Figure 1 [graphics not reproduced]).

Active buoys differ from passive buoys in that they use a sonar converter instead of a hydrophone, which emits pulses and receives them back after they are reflected off the target. A passive buoy is not always capable of detecting a submarine generating little noise, while the signal from an active buoy can be received on board the submarine, which can then attempt to escape pursuit. The two types of buoys, therefore, supplement each other: passive buoys detect a submarine, while active buoys rapidly determine its range.

All passive and active sonoradiobuoys are classified as directional or non-directional. Non-directional sonoradiobuoys receive signals from all directions and therefore determine only the presence of a submarine and the distance to it (only active ones). These sonoradiobuoys are of relatively simple design and are inexpensive.

The latest directional buoys are equipped with a built-in compass and directional sonar converters by means of which the distance to the submarine and its bearing are determined. Two or three times fewer such sonoradiobuoys are required for this.

Buoys have recently been developed in the United States, Great Britain and France, for which the period of their operation is determined by remote radio control from an aircraft, which saves the electric energy of the power batteries, thereby increasing the duration of their functioning, and also gives greater concealment to their operation in the active mode. These include the American AN/SSQ-50 and -62 active sonoradiobuoys (the latter is directional and is in experimental use), the British X17255 active multi-beam buoy and the French TSM 8010 and 8020 active/passive buoys.

A number of nations have already developed or are developing compact buoys from existing ones, which, while retaining the required tactical and technical characteristics, are shorter by three times and weigh 2.5-fold less than the original models. These include the British 30104 buoy, the French TSM 8020 and the American DVARF. Reducing their height to 35 centimeters and their weight to 4 kilograms makes it possible, with the length of the tubular launchers unchanged, to increase the number of sonoradiobuoys on an ASW plane (or helicopter), which increases the aircraft's submarine detection capability.

The basic tactical and technical characteristics of certain sonoradiobuoys of the ASW naval aviation of the United States, Great Britain and France are given in the table [table omitted from translation].

The range at which a submarine can be detected by means of modern buoys is around 10 kilometers in the active mode and 30 kilometers in the passive. Determination of a submarine's location depends not only upon the buoy's accuracy, but also upon the degree of precision with which the coordinates of the buoy floating on the surface of the sea are determined on board the plane (or helicopter).

According to the foreign press, the American R-3C "Orion" and S-3A "Viking" aircraft are equipped with a passive system, which determines a buoy's coordinates and functions like an interferometer. It has 10 antenna pairs, is automatically tuned to the frequency of 1 of 31 standard sonoradiobuoy channels and is self-calibrating. The antennas are installed on the outside of the fuselage. The bearing to the buoy is measured by the difference in the phases of the signal emitted by it and received by the antennas. The bearing measurement data are processed by means of an electronic computer, which also issues the buoy's coordinates,taking its drift into account. It is not necessary to fly directly above sonoradiobuoys to determine their coordinates.

The sonar signals received by the buoys are transmitted by means of combat radio transmitters to an ASW plane (or helicopter) flying over in the vicinity. The radio transmitter is tuned at the plant to a certain working frequency of 31 possible frequencies within the 162-173 megahertz band. The foreign press reports that buoys have been in use since the end of the 1970's, the radio transmitters of which are tuned to 1 of 99 possible frequencies on a broader band (136-173 megahertz). The frequencies of these radio channels are separated by 375 kilohertz. Increasing the number of possible working channels for the buoys has reduced the possibility of their interfering with each other even when dropped in dense concentrations at sea.

Modern sonoradiobuoys are dropped from altitudes of 50 meters to 12 kilometers at high-speed flights of 90-650 kilometers per hour (Figure 2). The minimum altitude is determined from the time required for the brake parachute to open or the stabilizing balloon to inflate, so that the buoy enters the water vertically. This is essential so that when the buoy enters the water the impact falls precisely upon the proper area of its surface and to prevent splashing from the cable lowered to the prescribed depth, which might be picked up by a submarine. The latest buoys enter the water at a speed of around 25 meters per second.

Sonoradiobuoys are scanning means for once-only use, which, after their prescribed period of operation has elapsed (a maximum of eight hours), sink themselves. Judging from reports in the foreign press, great quantities of buoys are used each year. The following buoys were acquired in the United States in 1979, for example: 170,000 AN/SSQ-41B, 99,200 AN/SSQ-53, 15,200 AN/SSQ62 and 4,000 AN/SSQ77. The cost of their purchase by the U.S. Navy has increased by approximately 20 million dollars over the past 3 years, reaching 108.86 million dollars in the 1980 fiscal year.

Around 32 percent of the buoys purchased by the U.S. Navy are active, approximately 67 percent are passive and an insignificant percentage are special-purpose buoys. The latter include not only bathythermographic buoys, but also the AN/SSQ-57A used for recording spectrograms of noises from submarines and surface ships, which are stored in the memory unit of an airborne electronic computer and are then used for classifying detected targets by comparing them with the noises received by scanning buoys.

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